

Pest Management Grants Final Report:

Santa Barbara County Regional IPM Coalition

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## **DISCLAIMER**

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*Policy Committee Advisory Committee:* Rick Wheeler (South County Deputy Director, Santa Barbara County Parks Department), Glenn Franklin (Park Services Manager, City of Santa Maria Parks Department), Greg Chittick (Board Member, Pesticide Awareness & Alternatives Coalition), Jeff Cope (Assistant Director, City of Santa Barbara Parks & Recreation Department), Bruce Chavez (Facilities Manager, Santa Barbara School District). They provided valuable input regarding policy direction and applicability to their jurisdictions or organizations.

*Training & Equipment Advisory Committee:* Larry Fuaset (Santa Barbara County Flood Control Operations and Maintenance Supervisor), Derek Johnson (General Manager, Isla Vista Recreation & Parks District), John LaFleur (Grounds Manager, Ganna Walska Lotusland), Alex Pittmon (Director of Facilities, Santa Barbara City College), Julie Hendricks (Assistant Facilities Director, Santa Barbara City College), Mary Ann Rajala (Agricultural Biologist, Santa Barbara County Agricultural Commissioner's Office), Steve Takaya (City of Santa Barbara Parks and Recreation),

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*Roundtable Discussion Leaders & Technical Experts:* Alex Pittmon, Code Blea (City of Lompoc, Department of Parks and Urban Forestry), John Cook (Facilities Director, UC Santa Barbara), Mary Ann Rajala

*Outside Trainers & Technical Experts:* Deborah Raphael (Toxics Reduction Program Manager, City of San Francisco), Karl Bruskotter (Department of Environmental Programs, City of Santa Monica), Belinda Messenger (Associate Environmental Research Scientist, California Department of Pesticide Regulation), Julia Dyer (Environmental Scientist, Central Coast Regional Water Quality Control Board), Terrell Salmon (Wildlife Ecologist, UC Davis Cooperative Extension), Cheryl Wilen (Weed Ecologist, UC Cooperative Extension Integrated Pest Management Program).

*Equipment Demonstration:* City of Santa Barbara (Aquacide Machine), County of Santa Barbara (Radiant Heat), Ventura Unified School District (modified Steam Weeder).

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## EXECUTIVE SUMMARY

This program was initiated with two basic premises: First, grounds managers of parks, schools, and private landscapes within a region face similar pest problems and would benefit from the sharing of experiences on a peer to peer basis. Second, multiple jurisdictions within Santa Barbara County are independently developing reduced risk pest management programs, have common stakeholder needs, and would equally benefit from increased peer to peer communication. In addition, the following issues were identified within the region: Citizen groups seek more information about pesticide use on a site by site basis. Grounds' managers desire flexibility in managing diverse landscapes, and are looking for a way to share information and experiences with peers. Civic leaders need incremental, measurable risk reduction objectives for budgeting purposes. Public agencies are mandated by the Federal Clean Water Act to prevent impairment of water quality. These issues are similar to those of other regions in California. The stated objectives of the project were:

**Objective 1. Create a multi-jurisdictional, public/private, 'Regional IPM Coalition' to collaboratively assist partners as they work to improve their IPM programs, promote IPM in residential areas, and protect regional water quality.** The Regional IPM Coalition first met in April 2002 and continued to meet at least monthly through January 2003. Twenty different jurisdictions, managing over 2,600 acres of high-use landscapes, regularly participated in the Coalition. Another 10 to 15 agencies attended meetings intermittently during the year.

Three advisory committees were established to work on key issues identified by the Coalition. The **IPM Policy Advisory Committee** developed two model IPM policies, one addressing the policy needs of school districts and the other for city or county jurisdictions or their individual departments. The **Training and Equipment Advisory Committee** developed a series of peer-to-peer roundtable training sessions to exchange practical experiences about shared pest problems. The Coalition sponsored eight training sessions and five roundtable discussion meetings. The **Pesticide Use Communication Advisory Committee** refined a 'zone'-based pest management system that met the stated needs of stakeholders. By the end of the grant period at least six jurisdictions were in the stages of piloting the zone system on a trial basis.

**Objective 2. Generate a model Regional IPM Implementation Plan to serve other communities with similar goals.** This document serves as the IPM Implementation Plan to allow other jurisdictions to adopt similar programs in their area.

The promotion of reduced risk pest management practices has been greatly advanced through the activities of the Coalition. One hundred percent of post-program survey respondents said they had or were planning to implement reduced-risk practices based upon information from the program on an estimated eighty seven percent of high use landscape acreage. Ninety four percent said they would actively participate if the program were continued.

This unique format of providing technical and administrative assistance to local agencies and school districts through an independent Coalition has proven to be very successful.

## **FINAL REPORT**

### **INTRODUCTION:**

Concerns are increasing about the potential impacts to the health of citizens, ecosystems, and waters in our region from landscape pesticides and fertilizers. Local efforts to address these concerns have been advancing individually among public agencies, school districts, and landscape companies. The measurable goals of such programs are often difficult to define, and the diverse needs of key stakeholders are complex.

The Regional IPM Coalition, formed and funded with support from the Department of Pesticide Regulation IPM Demonstration Grant Program, sought to address these concerns based upon the following premises:

- 1) Regional stakeholders share similar pest and IPM implementation challenges;
- 2) Many stakeholders have found unique and effective management tactics that would benefit other stakeholders; and,
- 3) IPM efforts would be more productive if approached collectively rather than individually.

The Santa Barbara County Regional IPM Coalition identified the following needs:

- 1) Grounds Managers require the flexibility to respond to diverse property types, uses and needs, and must communicate with peers who have similar objectives to maximize management improvements.
- 2) Citizens seek information about the potential risks of materials used at a particular site that is clear and consistent between jurisdictions. They are also frustrated at the prospect of having to change the management of an entire municipality just so they can feel secure that their children can play or visit a site without undue risk from chemical exposures.
- 3) Civic Leaders need achievable, measurable risk reduction objectives for time and budget planning. They often have difficulty responding effectively to public concerns and pressures because of a lack of common definitions and objectives, and they are concerned about potential compromises to the condition and safety of assets that they perceive to be a result of IPM.
- 4) Civic leaders also recognize that a regional approach rather than a jurisdictional approach will be a more efficient method of achieving environmental protection goals.

This program sought to meet these diverse needs with three primary areas of focus: training and information exchange, development of a guiding document (policy), and development of a 'zone management' decision making tool.

#### **Project Objectives:**

1. Create a multi-jurisdictional, public/private, 'Regional IPM Coalition'. This Coalition will collaboratively assist partners as they work to improve their IPM programs, promote IPM in residential areas, and protect regional water quality.
2. Generate a model Regional IPM Implementation Plan to serve other communities with similar goals.

The tasks intended to achieve these objectives:

*Task 1. Create Regional IPM Coalition.*

*Task 2: Assist Coalition Partners with implementation of IPM practices.*

*Subtask 2.1: Design methods of communicating pesticide use information on a site by site basis.*

*Subtask 2.2. Articulate measurable and incremental risk reduction objectives to assist in capital and personnel budgeting.*

*Subtask 2.3. Formulate a public outreach strategy encouraging IPM in residential areas.*

*Subtask 2.4. Identify and share common training needs and events.*

*Subtask 2.5. Explore cooperative funding and use opportunities for IPM equipment and renovation.s.*

*Subtask 2.6. Develop new, and build upon existing, elements of a guiding document.*

*Task 3: Assist Coalition Partners with their efforts to prevent pesticides from impacting surface and ground water quality.*

*Task 4: Assist Coalition Partners with their efforts to encourage IPM in residential areas.*

*Subtask 4.1: Outreach to landscape professionals.*

*Subtask 4.2: Educate by Example.*

*Subtask 4.3: Outline future public outreach and communication campaigns.*

## **RESULTS:**

### **Task 1. Create Regional IPM Coalition.**

The Santa Barbara County Regional IPM Coalition was formed with an organizational meeting in April 2002. Grounds and facilities managers from school districts, colleges, and parks, parents, pesticide reform advocates, and an executive assistant to a county supervisor attended this meeting to learn about and recommend changes to the scope of the project. This and the majority of subsequent meetings were held on the campus of Vista de Las Cruces School located at the midpoint between northern and southern Santa Barbara County. The decision to use this meeting location proved valuable as it provided a convenient meeting point and maintained the independent status of this coalition.

Three advisory committees were formed to direct the Coalition tasks: policy development, cooperative training and equipment needs, and pesticide use communication (zones). The Coalition met a total of 19 times between April and January in organizational (4), training (8) and advisory-committee (7) capacities.

Although funding support for this project has ended, the Regional IPM Coalition will continue to meet periodically to share information. New funding sources are being sought to support specific Coalition activities.

### **Task 2: Assist Coalition Partners with implementation of IPM practices.**

**Subtask 2.1: Design methods of communicating pesticide use information on a site by site basis.**

**Subtask 2.2: Articulate measurable and incremental risk reduction objectives to assist in capital and personnel budgeting.**

**Subtask 2.3: Formulate a public outreach strategy encouraging IPM in residential areas.**

## **Development of Zone Management System:**

These tasks have been addressed through the development of a 'zone' system of grounds management. This system, currently in trial by several Coalition partners and collaborators, assigns sites to 'zones' based upon the potential for sensitive individuals, species, or habitats to be impacted by pesticides at that site through contact, drift, and/or run-off.

'Green' zones are areas where, because potential exposure is the highest (such as turf or playgrounds), pesticide use must be minimized or eliminated. 'Yellow' zones are those areas where normal use of the site would not include skin contact or other routes of pesticide exposure, or where maintenance of the site is currently dependent upon minimal use of pesticides. 'Special Consideration' sites are those in which using alternatives or trial control methods may put the applicator at risk (high use roadways, tarmacs), or where maintenance of the site is currently dependent upon regular pesticide applications and no proven alternatives are available (golf courses).

Green and Yellow zones would share a carefully screened 'Approved' materials list (currently based upon the parameters of San Francisco's 'Tier 3 /Allowed' list and the Healthy Schools Act 'Exempt Materials' list). Green zones would allow materials other than these to be used on a one time basis and with a 14-day window when use of the site was not expected. Yellow zones would allow materials other than those on the 'Approved' list to be used with further screening and with a 7-day window when use of the site was not expected. Special Consideration zones would allow a broader range of materials, still screened for health and environmental impairment, with 72-hour posting. Please see Attachment A' for a more detailed description.

#### **Primary assumptions leading to Zone Management System:**

The zone management system evolved as a mechanism to balance health concerns and site maintenance needs. It is based upon the following assumptions:

1. Jurisdictions with diverse sites will have a need for diverse materials, some of which may pose a greater health and environmental risk than others.
2. To reduce *risk* we must address the *hazard* of the material, and the potential for *exposure* to the material by drift, run-off, volatilization, or contact with residues (see Measures of Risk Reduction, below).
3. Sustainable risk reduction requires a shift in current management models and systems. Very few existing school or park settings have been designed with pest prevention as a primary design factor.
4. This shift in management models allows for incremental steps towards risk reduction while alternative practices are investigated and habitats are modified to prevent future pest problems.
5. The most effective method of transition will be to prioritize areas of the greatest need first based upon potential exposure, and designating these as sites where no or very reduced-risk pesticides would be used.

#### **Zone Comparison Chart:**

	<b><i>GREEN</i></b>	<b><i>YELLOW</i></b>	<b><i>Special Circumstance</i></b>
<b><i>Described</i></b>	Areas where intended use makes exposure to pesticides likely.	Areas where intended use makes exposure to pesticides possible but not likely.	- Restricted access - Practitioner at risk - Function of site dependent
<b><i>Site Example</i></b>	- Recreational turf - Playgrounds (asphalt, sand, mulch, etc.)	- Parking islands - Slopes not draining onto field	- Fenced yards - Roadways - Golf courses



	- Sensitive habitat		- Cliff sides
<b><i>Allowed Pesticides</i></b>	- S.F. Tier 3 - H.S.A. Exempt	Same as Green	S.F. in total, with conditions (or similarly screened)
<b><i>Exception Materials (non-emergency)</i></b>	One time with: - S.F. Tier 2, with conditions (or similarly screened) - Must have plan to prevent future application	- S.F. Tier 2, with conditions (or similarly screened)	Emergency situations to protect human health and assests
<b><i>Period of Posting, Limited access after exception materials applied</i></b>	14 days	7 days	72 hours

### Measures of Risk Reduction:

For the purposes of this project, the following definition has been used:

**RISK = HAZARD x EXPOSURE.** This project provides measures for these two functions of this risk equation, and is thus a measure of risk reduction.

Hazard: For the terms of this project 'hazard' is loosely defined as the potential for a given pesticide to cause biological or environmental harm. This issue is addressed through the adoption of a materials list and establishing areas where certain pesticides can or cannot be applied. The current draft of the zone management model builds an allowed materials list from two sources: the San Francisco IPM Program Reduced Risk Pesticide List<sup>1</sup> and the California Healthy Schools Act List of Exempt Pesticides.<sup>2</sup> The San Francisco list screens for the potential of the pesticide to cause cancer, reproductive harm, endocrine disruption, eco-toxicity, or water quality impairment. The Healthy Schools Act exempts materials that are considered by the U.S. E.P.A. to pose a reduced risk.

Exposure: The current zone management model attempts to reduce risk by defining pest management zones based on the potential for exposure. It defines 'green zones' as areas where the function of the site would make exposure to applied pesticides likely. Examples include recreational turf, asphalt play surfaces, and garden areas. 'Yellow zones' are described as areas where the function of a site would make exposure to applied pesticides possible but not likely. Examples include landscaped islands in parking areas, double fencelines or strips between two fences, or parking lots where skin contact is unlikely. The 'special circumstances' zone is defined as areas where the potential for exposure, particularly to sensitive populations, is low.

Taken individually, neither function of the equation necessarily reduces risk. A parent generally has no way of determining if none or all of the pesticides with varying hazards have been used on any given park, thus a materials list alone does not guarantee reduced risk. Similarly a

<sup>1</sup> The San Francisco IPM Program Reduced Risk Pesticide List (specifically the Hazard Tier assignment [http://www.sfgov.org/sfenvironment/aboutus/toxics/pest\\_list.htm](http://www.sfgov.org/sfenvironment/aboutus/toxics/pest_list.htm))

<sup>2</sup> Healthy Schools Act List of Exempt Pesticides (active ingredients are FIFRA 25(b) exempt and inert ingredients are included on the U.S. E.P.A. 4(a) list: <http://www.epa.gov/opbppd1/biopesticides/otherdocs/list4adocs.htm>)

jurisdiction could address exposure by assigning zone designations to sites, but without a mechanism to prioritize pesticides based upon hazard, there is limited risk reduction. Therefore to achieve significant reduction of risk, both functions must be addressed simultaneously.

### **Demonstration of Zone Management System**

An example of this system was demonstrated at the Ventura Unified School District. This district of 28 campuses and a very dedicated group of community activists was the first to test the zone system. All campuses were mapped. Problem weed areas within 'green zones' were identified, and the district grounds staff and Regional IPM Coalition were enlisted to design habitat modifications for these areas, such as inexpensive mow strips around portable classrooms previously maintained with herbicides, and then with difficulty with weed whips. Staff was trained to implement a system that provided for conventional herbicide applications over school holiday periods in areas of limited exposure, or 'yellow zones'.

The results of this pilot program include:

- Administrators are satisfied with the incremental approach, the reduction of liability, the continued use of cost effective conventional weed management practices in areas of low exposure, identification of high-priority habitat modification projects in areas of high exposure, and the cooperation of community activists.
- Buy-in among grounds staff has increased with the logical decision making process visually demonstrated by clear zone maps, and from being included in the 'green zone' habitat modification design process.
- Community activists are satisfied that progress is being made toward overall reduction of pesticide use and that immediate risk reduction is achieved in areas of greatest need through this zone system.

### **Current Status of Zone System:**

This methodology is currently evolving between efforts at the Ventura Unified School District, Los Angeles Unified School District, the City of Santa Monica, and the Santa Barbara Regional IPM Coalition. Within the Coalition the Santa Barbara County Parks Department, Santa Barbara City Parks and Recreation Department, Santa Maria City Parks Department, Isla Vista Recreation and Parks District, Santa Barbara City College, the University of California Santa Barbara, and the Green Gardener Certification Program have all expressed the intent of implementing this zone system. A grant request to formally test and refine this zone management system on a statewide basis has been submitted, and the status is pending.

#### *Task 2: Assist Coalition Partners with implementation of IPM practices.*

##### *Subtask 2.4: Identify and share common training needs and events.*

The coalition held a total of 10 training sessions – five round table discussions and five special topic sessions. See Attachment B for a complete list of training session topics and speakers.

The five round table training sessions were held at the Vista de Las Cruces school and the Lake Cachuma County Park, selected as mid-points in the county. The training format for these meetings was based upon the premise that the majority of practitioners share the same problems, and many have found unique and effective management tactics that may benefit

the entire group. Each discussion was guided by a Coalition peer member in a round-table format.

Three special training events were hosted to provide Coalition members information from statewide experts. The topics covered were requested by Coalition members: examples of IPM efforts from other jurisdictions around the state, gophers and ground squirrel control methods, and effective methods of weed control. As a part of the weed control session, different types of weed control methods and equipment were demonstrated in a “weed race” trial. The results of this comparison are summarized below, and detailed in Attachment E.

In addition, a total of 18.5 hours of DPR approved Continuing Education Units were offered to Coalition Partners between April 29, 2002 and January 31, 2003.

Two additional education sessions were held in cooperation with the Green Gardener Certification Program during the normal 'IPM In Landscapes' classes for that program. Several Coalition partners from school districts participated in these sessions, and appreciated the opportunity to share ideas with landscape professionals.

### **Weed Race Summary:**

Four weeding technologies were compared side by side for cost of application, speed of application, and efficacy on 100 square foot plots. The technologies tested were Round-up herbicide, the Aquacide hot water weeder, the Ventura Unified custom hot water weeder, and the Infraweeder radiant heat weeder.

Steam weeding and Round-up proved equal in cost of application and efficacy over 86 days. The Round-up application was considerably faster than the others, but this margin may be reduced by time required for record-keeping, posting and notification, and application scheduling restrictions on high use sites that may be required of pesticide use and not for non-chemical technologies. Differences in efficacy were evident between the two hot water weeders that may be attributed to delivery head design. The Infraweeder provided limited long-term efficacy on large plots, but did demonstrate other beneficial uses.

#### Task 2: Assist Coalition Partners with implementation of IPM practices.

##### Subtask 2.5: Explore cooperative funding and use opportunities for IPM equipment and renovations.

The primary benefits from this effort have come from the exchange of information on a peer-to-peer and expert-to-peer basis rather than from a piece of equipment or alternative technology. Further, project-end surveys indicated a strong desire to continue Coalition work. The opportunity exists for active partners to support meeting, research, and training activities on a shared basis with a relatively low annual contribution. This concept has been informally discussed, and will be pursued in the upcoming months.

#### Task 2: Assist Coalition Partners with implementation of IPM practices.

##### Subtask 2.6: Develop new, and build upon existing, elements of a guiding document.

A number of different types of guidance documents have been used by jurisdictions around the country to implement IPM programs. These guiding documents have been adopted as legislation, administrative codes, regulations, policies, strategies, or administrative guidelines. They each vary in the amount of structure, detail, flexibility, and enforcement that they provide. An advisory committee was established by the Coalition to collect and

evaluate existing IPM guidance documents adopted by other jurisdictions around the state for their application to Santa Barbara County. Members of the advisory committee included representatives from city and county agencies, schools, and community organizations.

The committee discussed the pros and cons of each type of guiding document. Flexibility and ease of implementation were important elements in the type of guiding document that agency representatives on the committee preferred. Accountability, continuity of implementation over time, and adequate enforcement were important criteria for community members of the committee. All members agreed that since an administrative code, and any proposed changes to it, must be reviewed and approved by a jurisdiction's decision making body, this would limit the amount of flexibility an agency would have in its implementation. A significant concern was that it could reduce a jurisdiction's ability to easily modify its program as new IPM methods and practices developed over time.

Administrative guidelines, on the other hand, may allow a jurisdiction too much leeway in their program implementation. Pest control procedures or reporting requirements may not be clearly outlined in an administrative guideline. In addition, there may not be adequate oversight by decision-makers as staff makes changes to the program. Opportunities for input from interested members of the public may also be limited or non-existent. Accountability and continuity of implementation over time can become issues.

As a result, the committee agreed that the adoption of a formal policy document provided the greatest combination of accountability and flexibility for both an agency and the community.

At a minimum this policy should outline specific goals from each section to provide consistent guidance to the practitioners in the field. The document in its entirety should be included, or modified as appropriate, either at the policy or the administrative level to provide further guidance.

The committee developed two model policy documents, one for adoption by local government agencies or their individual departments and the other for school districts. These policies are included in their entirety in Attachment D.

*Task 3: Assist Coalition Partners with their efforts to prevent pesticides from impacting surface and ground water quality.*

The materials list proposed for this zone system is based in part upon the San Francisco Reduced Risk Pesticide List screening protocol. This selection process evaluates a pesticide's soil mobility, toxicity to aquatic organisms, and presence in currently impaired water bodies. If a material shows potential to cause harm to surface or ground water it would not be included in the approved green/yellow materials list. Further, the methodology for designating sites to zones includes evaluation of habitat sensitivity. For example areas of high erosion or potential for run-off into surface waters may be designated as a green zone. Therefore only materials which have been shown to have low soil mobility, low eco-toxicity to aquatic organisms, and not identified as water impairment chemicals from the San Francisco list may be used in these areas, unless specific mitigations are in place.

This methodology has been presented to Project Clean Water, a consortium of public and private interests involved with improving water quality. The partners were interested in the

system, and will investigate it further when it is more fully evolved. Additionally, Julia Dyer of the Central Coast Regional Water Quality Agency made a presentation to the Coalition describing the legal issues surrounding pesticides and water quality.

*Task 4: Assist Coalition Partners with their efforts to encourage IPM in residential areas*

*Subtask 4.1: Outreach to landscape professionals.*

*Subtask 4.2. Formulate a public outreach strategy encouraging IPM in residential areas*

*Subtask 4.3: Educate by Example*

*Subtask 4.4: Outline future public outreach and communication campaigns.*

Outreach to the residential sector is critical if pest management impacts to humans and the environment are to be significantly reduced. It is generally assumed that roughly half of all pesticide use is in the residential sector with a higher potential for misuse and exposure than in agricultural industries. As it was pointed out during a Coalition meeting, it isn't the schools and the parks buying pallets of diazinon every week from home improvement stores.

Yet the schools and parks may play a pivotal role in effecting change in the residential sector. Their leadership in providing aesthetically pleasing and functional landscapes with reduced-risk practices will serve as an important demonstration to the public, and will contribute towards a comprehensive shift away from reliance upon pesticides.

**The recommended steps to maximize this effort include:**

1. Formalize the Regional IPM Coalition into a free-standing body with some authority of review, oversight, and material approval, as well as identifying training and research objectives.
2. Full implementation of the zone system by multiple regional jurisdictions.

**The resulting products of these efforts include:**

1. A universally accepted reduced-risk pesticide list.
2. Cooperative efforts to solve regional pest problems.
3. An educational and demonstration platform for the residential sector.

**From this platform several efforts may be launched, including:**

- Green Zones as educational and demonstration sites: With multiple jurisdictions managing within the zone model the public may visit and observe diverse habitat modification and sustainable management practices that fit within the Green Zone model. Further, these jurisdictions would develop Best Management Practices (BMP's) designed specifically for Green Zones and would serve as guidelines for the public.
- Distribution of materials list: A tangible list of materials screened for human, ecological, and water quality safety that is utilized by multiple jurisdictions will have high credibility and influence. The list may be incorporated into landscape training curriculum through the Green Gardener Certification Program, Santa Barbara City College Environmental Horticulture Program, and Master Gardener training.
- Integration of materials list into retail education programs such as 'Our Water Our World'

- Outreach to landscape professionals: The Regional IPM Coalition partnered with the Green Gardener Certification Program. This program trains landscape professionals in resource conservation, including IPM. The results of this partnership brought the activities of the Coalition to the attention of over 100 landscape professionals, several of whom became regular attendees at Coalition meetings and trainings. The zone system was discussed with these professionals, and may be tested through the Green Gardener Certification Program at the residential level.

These efforts in combination should provide the momentum in the community to reach a critical mass of opinion that believe reliance upon pesticides is no longer necessary.

## **Discussion**

### **Benefits of Zone System:**

This graduated zone system is designed to allocate limited resources to areas where pesticide use poses the greatest risk, and to incrementally reduce reliance on pesticides based upon resources, community concern, and availability of proven alternatives.

Risk is reduced by addressing both hazard and exposure; habitat modifications can be budgeted by shifting resources rather than waiting for new resources; long term risk reduction goals may be set and measured through expansion of green zones; pesticide risk is clearly communicated to the public with colored maps; and a consistent system between jurisdictions will provide for focused, collaborative pest management solutions.

The design of this project is to create a model that is free-standing and not geographically specific, and may therefore be widely adopted with little implementation oversight. Once formally tested, and with limited continued promotion and support, this zone management system may prove to be a most valuable tool for risk reduction in the urban and residential sector throughout the state.

With this zone system pesticide use will be communicated in advance and in a way that is common between jurisdictions. It is proposed that color maps be posted or made available at public sites describing the zones and associated pesticide use restrictions for each. This process will allow the public to make better informed decisions about which parks they visit, and will facilitate better communication between community members and civic leaders about pesticide use objectives.

This decision-making methodology provides a tool that allows personnel, habitat modification, and equipment replacement resources to be directed toward areas of greatest need. At Ventura Unified School District problem weed areas in 'green zones' have been assigned a higher priority. Resources saved by utilizing conventional pest management practices in 'yellow zones' are being directed to these priority 'green zone' areas. Within Santa Barbara County Parks most of the recreational turf would fall into a 'green zone' designation. However the surrounding picnic areas are still maintained with herbicides. Park personnel hope to map these sites, then budget habitat modifications to the picnic areas to prevent weeds and bring these sites into the 'green zone' category. This visual demonstration of pest management objectives also helps grounds managers communicate with fiscal decision makers.

Both of these examples demonstrate how this process is logical, incremental, and measurable. Risk is reduced by addressing both hazard and exposure, habitat modifications can be budgeted by shifting resources, and long term risk reduction goals may be set, budgeted, and measured through expansion of green zones.

## **Measures of Success:**

The proposal for this project identified five measures by which to evaluate the success of this program.

### **1. Acreage under modified management due to project.**

A pre-program survey was distributed on several occasions to Coalition Partners to gather baseline data about acres managed, acres per employee, training needs, and status of formal IPM programs. A post-program survey was distributed once at the January 23 field training day to evaluate the number of sites implementing practices learned through the program, percent of landscape acreage with management modified because of the program, interest in participating in future Coalition activities, and future training needs. A complete summary of findings may be found in Attachment E.

*A few points of interest include:*

- One hundred percent of post-program survey respondents said they had or were planning to implement reduced-risk practices based upon information from the program.
- Management on eighty-seven percent of represented acreage has or will be modified using reduced-risk practices gained from this program.
- Ninety four percent said they would actively participate if the program were continued.

### **2. Successful completion of designated tasks and methods.** Described in body of report.

### **3. Completion of 10 hours DPR approved Continuing Education training.** Actual CEU's offered was 18.5.

### **4. Completion of one IPM Coalition Field Tour.** Completed January 23, 2003.

### **5. Professional facilitation at three important stages of the program to insure that the objectives of the program are met.** A professional facilitator who donated his services directed the first large general Coalition meeting. It was the determination of this facilitator that such services were not needed for future meetings since there was little conflict or barriers to completion that could be anticipated.

Additional benefits and successes of this project:

**Attendance at Meetings and Training Sessions:** Participation among the targeted stakeholders was positive and remained high, with 20 different jurisdictions participating regularly. Another 10 jurisdictions sent representatives to at least one meeting or training session during the grant period. These stakeholders are considered the leaders in the community, and their actions will likely be mirrored by others in the community.

### **Outreach:**

- The Santa Barbara City Council and Mayor requested a presentation about the Coalition (September 10, 2002), and stated that the Coalition will be important to the advancement of a citywide IPM program.
- The Santa Barbara School Districts relied upon Coalition resources to modify a draft IPM policy, which was subsequently adopted by the Board of Trustees.
- One-hour radio interview on local talk show about program with principal investigators, a representative of Central Coast Environmental Health Project, and a representative from City of Santa Maria Parks and Recreation Department.

- The concept of the draft Zone Management System was presented to DPR's California School IPM Advisory Committee (July 2002).
- The results of this program have been presented at the City of San Francisco's 5th Annual IPM Conference (January 2003) and the California Parks and Recreation Society Regional Meeting (November 2002).
- Multiple Coalition Collaborators are adopting the Zone System for their grounds management activities.
- Development of website with pictures and technical information from Coalition activities (<http://communityenvironmentalcouncil.org/ipm/ipmcoalition.html>).
- City of Santa Maria Parks and Recreation Department Landscape Contract Specifications distributed to Coalition partners and posted on website courtesy of Alex Posada, Parks Director, and Glenn Franklin, Park Services Manager for the City of Santa Maria This document received an Award of Excellence from the California Parks and Recreation Society and provides specifications for new construction of weed suppression tactics.



## **Summary and Conclusions: Project Summary Form**

**1. Proposal Title:** Santa Barbara County Regional Integrated Pest Management Coalition

**2. Principal Investigators:** Phil Boise, Karen Feeney: Community Environmental Council

**3. Alternative Practices:** The unique alternative practice of this program was communication. Coalition partners and collaborators worked together on 19 occasions to explore alternative practices, policy issues and pesticide use communication. Training topics included: Raccoon Roundworm / West Nile Virus; IPM of Weeds in Hardscapes; IPM of Greenbelts and Landscape Beds; IPM of TURF; Laws and Regulations - Schools and Creeks; IPM Efforts Around the State; Vertebrates; and Weeds. Heat weeding (hot water/steam and radiant heat) was compared side by side to Round-up for efficacy, cost of application and time of application.

**4. Summary of Project Successes:** Thirty-five jurisdictions (public/private schools, parks, colleges, consultants, environmental groups) participated in one or all of nineteen workshops or meetings. One hundred percent of surveyed participants have or plan to implement reduced-risk practices on eighty-seven percent of high-use recreational landscape acres (1991 acres of 2197 represented) based upon program. Ninety-four percent surveyed would continue to actively participate in future Coalition activities.

5. Number of Participating Jurisdictions: <b><u>35</u></b>	12. Number of Field Days: <b><u>1</u></b>
6. Total Acreage in Project: <b><u>2197</u></b>	13. Attendance at Field Day: <b><u>84</u></b>
7. Project Acreage Reduced-Risk: <b><u>1991</u></b>	14. Workshops & Meetings: <b><u>19</u></b>
8. Total Acres of Recreational Landscape: <b><u>Unknown</u></b>	15. Workshop Attendance: <b><u>12 - 84</u></b>
9. Non-Project Reduced-Risk: <b><u>Unknown</u></b>	16. Number of Newsletters: <b><u>0</u></b>
10. Number of Participating PCA's: <b><u>5 - 12 PCA/QAC/QAL</u></b>	17. Number of Articles: <b><u>0</u></b>
	18. Number of Presentations: <b><u>5</u></b>

**11. Cost Assessment:** Primary benefit of program derived from information exchange. Associated costs for meeting and presentation facilitation are relatively low and can be shared among partners. Trials of alternative weed management technologies showed equal efficacy and application costs of hot water/steam to Round-up herbicide. Application time for alternatives was longer, but may be balanced with diminished record-keeping, notification and posting obligations associated with pesticide use on school campuses and some parks.

**19. Other Outreach Activities:** Grant proposal to continue some Regional IPM Coalition activities submitted, award announcements pending.

<b>FOR OFFICIAL USE ONLY</b>	Contract Number	Project ID
DPR ID#	Contract Manager	

## **ATTACHMENT A: Draft Zone Definitions:**

**Green Zones:** Areas where intended use of site would make exposure to applied pesticides likely.

**Examples:** Recreational turf; asphalt play surfaces; garden plots; sensitive habitat; slopes draining onto playing fields.

**Materials List:** (See Attachment SDLKFJ):

- San Francisco Tier 3 Allowed and Limited Use, or materials screened for same health and environmental effects
- Healthy Schools Act Exempt (FIFRA 25[b] actives, EPA 4[a] inerts)

**Exceptions:**

- Emergency situation to protect human health and assets
- One Time exemption if:
  - San Francisco Limited Use Tier 2 materials with stated conditions of use, or materials screened for same health and environmental effects
  - Habitat modification to prevent future need for pesticides (staff involvement)
  - Application timed to minimize exposure for 14 days following
  - Site posted for 14 days

**Yellow Zones:** Areas where intended use of site would make exposure to applied pesticides possible but not likely.

**Examples:** Landscape islands in parking areas; double fence lines; areas adjacent to or draining into sensitive habitats; slopes not draining to field.

**Materials List:** Same as for Green Zones

**Exceptions:**

- Emergency situation to protect human health and assets
- Use of material not on Yellow List if:
  - San Francisco Limited Use Tier 2 materials with stated conditions of use, or materials screened for same health and environmental effects
  - Application timed to minimize exposure for seven days following
  - Site posted for seven days

## **Special Circumstance Zones:**

Access to area is limited or restricted; applicator would be at risk from slower, more frequent applications with alternative products; or the quality of asset is dependent upon pesticide applications (e.g., specimen landscapes).

**Examples:** Locked storage yards; high use roadways; tarmacs; golf courses; cliff sides.

**Materials List:**

- Any products on San Francisco List with stated conditions of use, or materials screened for similar health and environmental effects
- Healthy Schools Act Exempt

**Exceptions:**

- Emergency situation to protect human health and assets

## **ATTACHMENT B: Training Session Topics and Speakers**

1. Raccoon Roundworm / West Nile Virus:  
Lead Instructor: Mary Ann Rajala, Santa Barbara County Agricultural Commissioner's office
2. IPM of Weeds in Hardscapes  
Lead Instructor: Alex Pittmon, Santa Barbara City College Director of Facilities
3. IPM of Greenbelts and Landscape Beds  
Lead Instructor: Codie Blea, City of Lompoc Department of Parks and Urban Forestry
4. IPM of TURF:  
Lead Instructors: Jon Cook, Director of Facilities, UC Santa Barbara  
Santos Escobar, Grounds Supervisor, City of Santa Barbara Parks
5. Laws and Regulations: Schools and Creeks  
Lead Instructors: Julia Dyer, Environmental Scientist: Central Coast Regional Water Quality Control Board  
Mary Ann Rajala, County Agricultural Commissioner's office
6. Green Gardener Certification Program: IPM in the Landscape: May, October 2003.

**Three special training events were hosted to provide Coalition members information from statewide experts.**

1. IPM Efforts Around the State:  
Instructors:  
Debbie Raphael, City/County of San Francisco Department of the Environment  
Karl Bruskotter, City of Santa Monica Department of Environmental Programs  
Tour of Isla Vista Recreation and Parks Department, practicing organic management exclusively for thirty years.
2. Vertebrate Tour of Douglas Family Preserve:  
Special two hour walking tour of a high-use open space park with extensive gopher damage.  
Instructor: Terrell Salmon, Cooperative Extension Wildlife Specialist
3. FIELD DAY:  
Vertebrates: Terrell Salmon, Cooperative Extension Wildlife Specialist  
Weeds: Cheryl Wilen: UC IPM Weed Ecologist  
Weed Races: Side by side comparison of various weed management technologies, including Round-up herbicide, Aquacide hot water weeder, Ventura Unified retrofitted hot water weeder, and Infra-Weeder radiant heat weeder. Discussion and analysis are included in Attachment E.

### **Other training opportunities:**

- Several videos from San Luis Horticultural Videos were purchased for loan to coalition partners. Titles include: "The Sustainable Landscape: Ecological Design Principles"; "Insects and Spiders and Mites: Recognizing Beneficials in the Nursery and Landscape"; "The Fundamentals of Pruning"; "Soil Biology"; "IPM: An Overview for the Consumer (English and Spanish)"; and "Hands-On Agronomy".
- A full inventory of past issues of Common Sense Pest Control Quarterly, and The IPM Practitioner, donated by William Olkowski.
- Infra-Weeder, utilized for on-site demonstrations at the Field Day and by the City of Santa Maria, the Green Gardener Certification Program, and Ventura Unified School District.

## **ATTACHMENT C: Weed Races: Discussion and Analysis**

Weed Races: January 23, 2003

The objective of this trial was to provide grounds managers with first hand information about the cost and efficacy of various weeding technologies.

### **Summary:**

Four weeding technologies were compared side by side for cost of application, speed of application, and efficacy on 100 square foot plots. The technologies tested were Round-up herbicide, the Aquacide hot water weeder, the Ventura Unified custom hot water weeder, and the Infraweeder radiant heat weeder.

Steam weeding and Round-up proved equal in cost of application and efficacy over 86 days.

The Round-up application was considerably faster than the others, but this margin may be reduced by time required for record-keeping, posting and notification, and application scheduling restrictions on high use sites that may be required of pesticide use and not for non-chemical technologies.

Differences in efficacy were evident between the two hot water weeders that may be attributed to delivery head design.

The Infraweeder provided limited long-term efficacy on large plots, but did demonstrate other beneficial uses.

### **Trial Design:**

Four weeding technologies were compared side by side at Lake Cachuma County Park at the Regional IPM Field Day on January 23, 2003. The tools were demonstrated on plots of predominantly filaree/medic/grass/plantain ground cover. The technologies were compared for cost of purchase, cost of application, time of application, and efficacy as measured by a twenty-step transect (described below). No cost of purchase information was reported for the Round-up application as a variety of sprayers may be utilized.

The Round-up application was made two days before the general meeting to avoid potential exposure of participants. The plots were roughly measured out to 100 square feet each. Plots were accurately measured at a follow-up transect, and the time and cost of application data was adjusted accordingly (plot 3 originally 120 ft<sup>2</sup>, plot 4 originally 121 ft<sup>2</sup>).

**Twenty Step Transect:** Data was derived from simple transect sampling methods. The investigator looked away from the plot, stepped to a random location, then observed the square inch of ground at the toe. If no living plant material was found the step was marked with a zero (0). Living plants were identified by C for Clover/Medic (unknown species); F for Filaree, G for Grass (unknown species), B for Brassica (wild mustard or radish), and P for Plantain (buckhorn). This process was repeated twenty times in each 100 square foot section.

The percent efficacy is intended to compare the treatment practices and not indicate percent of ground covered by living or dead tissue. The efficacy percentage listed was derived by dividing the total number of steps without vegetation by twenty sampling steps.

**Application Dates:** Round-up: January 21, 2003. Heat treatments: January 23, 2003.

**Transect 1:** February 3. 12-14 days following treatment. No rain between treatment and transects.

**Transect 2:** February 20. 29 - 31 days following treatment. Plots were observed five days after approximately two inches of rain, followed by sunny weather. Average night-time temperatures were in the high 30's, average daytime temperatures in the 60's.

**Transect 3:** March 26. 63-65 days following treatment. Plots were observed nine days after approximately four inches of rain, followed by mixed weather.

**Transect 4:** April 16: 86 - 88 days following initial treatment. Mixed cool weather since previous transect.

### **Technologies Tested:**

**Plot 1: Round-Up Pro**, 1.5% active ingredient, 2 oz. Per gallon.

**Plot 2: Aquacide weeding unit** owned jointly by the City of Santa Barbara Parks and Recreation Department and the Santa Barbara School Districts and manufactured by SmithCo Manufacturing (<http://www.smithco.com/aquacide.htm>).

**Plot 3: Ventura Unified School District hot water weeder**, manufactured and modified by the Sioux Steam Cleaning Company ([http://www.sioux.com/sioux\\_right.htm](http://www.sioux.com/sioux_right.htm)) according to specifications provided by the school district.

**Plot 4: Infra-Weeder Landscaper 100**, which heats an eight-inch by 12-inch ceramic plate to temperatures up to 1800 degrees Fahrenheit with a propane flame. (<http://www.rittenhouse.ca/asp/Product.asp?PG=527>).

**Results Summary:**

	<b>Roundup</b>	<b>Aquacide</b>	<b>Ventura</b>	<b>Radiant Heat</b>
Equipment cost (pre-tax)	n.a.	\$14,885	\$8,760	\$880
Time per 100ft <sup>2</sup>	2 minutes	12 minutes	13 minutes	15 minutes
Efficacy: 12 days	55%	75%	100%	45%
Efficacy: 29 days	95%	45%	95%	35%
Efficacy: 63 days	60%	30%	60%	10%
Efficacy: 86 days	35%	15%	30%	5%
Material	2 oz. Round-up Pro (1.5% a. i.)	0.2 gallon gas	0.21 gallon gas	13 oz. propane
	2 gallon water	0.2 gallon diesel	0.21 gallon diesel	
Material cost per 100 sq. ft.	72 cents (at \$46/gal)	30 gallon water	33 gallon water	
		72 cents (at \$1.79 gal ea.)	75 cents (at \$1.79gal ea.)	65 cents (at \$1.50/qt.)

**Observations/Discussion:**

<b>Field Notes</b>	<b>Round-Up:</b>	<b>Aquacide:</b>	<b>Ventura:</b>	<b>Radiant Heat:</b>
	Deep rooted weeds killed, little seedbank control	Loss of efficacy from nozzle placement	Deep rooted weeds not killed. Very little seedbank germination.	Utility not maximized in field clearing

**Overall efficacy:**

In summary, hot water technology provided the same level of control as Round-up for the duration of the trial (86 days), with identical application expenses. The time required for actual application was considerably less for Round-up than for any other alternative measure tested. Almost three months following treatment the Round-up plot showed control of deep-rooted weeds but did not prevent seeds from germinating, while the Ventura hot water plot showed limited seedling germination but incomplete kill of deep rooted weeds (plantain, perennial grasses). There was difference in efficacy between the two hot water units, due likely to the design of delivery head. The Infra-weeder did not perform well in this setting, although its value may be maximized in other settings.

**Differences in hot water unit efficacy:**

The difference in efficacy between the two hot water units may be explained by nozzle head. The Ventura Unified unit dispensed the combination of hot water and steam through a 4 inch 'cow bell' shaped applicator head, while the Aquacide unit dispensed the steam/water combination through a wheeled bar bearing four individual small-orifice nozzles. Photographs following application reveal weed survival and re-growth in the Aquacide plot in regular strips, presumably due to gaps between nozzles. It may be observed that the area treated with the 'cow bell' nozzle did not leave any definitive areas of weed survival.

The limiting factor with the hot water weeders is pump volume, in these cases approximately 2.5 gallons per minute for either unit. With hose-end temperatures for both units of approximately 160f it is clear that the mode of action is not the steam, but the hot water. Further, efficacy will be determined by volume-per-area (in these cases 30 gallons of water per 100 square feet) rather than by pressure. It therefore follows that the size of the delivery head doesn't matter as long as coverage is even, pressure is not restricted, and the rate of application (estimate 6 to 8 square feet per minute, or about 2.5 to 3 square feet per gallon) remains constant.

This type of weed control has been demonstrated to be of equal efficacy to Round-up after 86 days, and may be appropriate for times of wind or rain, and in areas where chemical herbicides are not desired. It may also be possible to use the equipment adjacent to inhabited structures (classrooms) with minor noise disturbance when the generator is by-passed with an extension cord plugged into an A.C. outlet, and by the water tank is continuously refilled with a hose. This may be useful to schools seeking to manage these areas without overtime, herbicides, or noisy equipment such as weed-whips, mowers or the electric generator of the independent hot water steamer.

### Recommended Uses:

	<b>Round-up</b>	<b>Hot Water</b>	<b>Radiant Heat</b>
<b>Best Use</b>	<ul style="list-style-type: none"> <li>• Areas of limited exposure, non-sensitive habitat</li> <li>• Spot treat invasive weeds</li> <li>• Persistent perennials</li> <li>• Erosion/fire prone slopes</li> </ul>	<ul style="list-style-type: none"> <li>• Areas of high exposure, sensitive habitat (around structures, recreational areas)</li> <li>• Mulched landscape beds</li> <li>• Young seedlings</li> <li>• Sidewalks</li> <li>• Asphalt surfaces</li> <li>• Fencelines</li> <li>• Turf edging</li> </ul>	<ul style="list-style-type: none"> <li>• Areas of high exposure, sensitive habitat (around structures, recreational areas)</li> <li>• Non-irrigated hard packed soil surfaces</li> <li>• Sidewalks</li> <li>• Asphalt surfaces</li> <li>• Young seedlings</li> <li>• Turf edging</li> </ul>
<b>Limited Use</b>	<ul style="list-style-type: none"> <li>• Areas of high exposure</li> <li>• Application restricted to off-hours, limited occupant proximity</li> </ul>	<ul style="list-style-type: none"> <li>• Non-irrigated soil surfaces (additional water may be problematic)</li> </ul>	<ul style="list-style-type: none"> <li>• Areas of flammable debris build up (fencelines, mulched beds)</li> <li>• Large weed areas</li> </ul>
<b>Other Considerations</b>	<ul style="list-style-type: none"> <li>• Limited by wind, rain, constant use of site</li> <li>• Use in low exposure areas may allow for labor resources to be directed toward habitat modifications</li> </ul>	<ul style="list-style-type: none"> <li>• Equal efficacy to Round-up over 86 days</li> <li>• Potential for use around occupied structures with proximity to AC power source and hose outlet (no generator noise)</li> <li>• No re-entry, mandatory posting, notification, record-keeping considerations</li> </ul>	<ul style="list-style-type: none"> <li>• Inexpensive, quite, one-person operation</li> <li>• Appropriate for parking areas, hardscapes, sand-boxes, play areas during school hours or with limited proximity of site occupants.</li> <li>• No re-entry, mandatory posting, notification, record-keeping considerations</li> </ul>



Transect data:

	Plot #1: Round-Up				Plot #2: Aquacide Hot Water				Plot #3: Ventura Unified Hot Water				Plot #4: InfraWeed Radiant Heat			
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<i>Day</i>	14	31	65	88	12	29	63	86	12	29	63	86	12	29	63	86
<i>Step</i>																
<b>1</b>	P	0	0	F	0	0	0	F	0	0	0	0	F	P	C	C
<b>2</b>	F	0	0	0	C	0	F	G	0	0	0	G	F	0	F	F
<b>3</b>	0	0	P	G	0	F	F	G	0	0	0	G	P	0	F	F
<b>4</b>	0	0	P	F	0	F	P	0	0	0	0	P	F	G	F	F
<b>5</b>	P	0	F	P	F	F	F	F	0	0	B	0	F	P	P	C
<b>6</b>	P	0	P	F	C	F	F	C	0	0	0	0	F	F	C	P
<b>7</b>	0	0	P	0	0	0	F	C	0	0	G	0	0	0	0	G
<b>8</b>	0	0	0	0	0	0	0	C	0	0	0	B	0	F	F	F
<b>9</b>	0	0	B	C	0	0	0	F	0	0	G	P	F	G	P	F
<b>10</b>	F	0	0	0	F	P	0	0	0	0	0	0	0	O	P	F
<b>11</b>	P	0	P	F	0	0	0	P	0	0	0	G	0	C	G	F
<b>12</b>	P	0	0	F	0	0	F	G	0	0	G	G	F	0	C	0
<b>13</b>	0	0	0	F	F	0	F	G	0	0	B	P	0	F	F	C
<b>14</b>	0	0	0	0	0	C	F	F	0	0	0	G	F	C	F	C
<b>15</b>	F	0	0	F	C	F	0	0	0	0	0	G	0	G	F	C
<b>16</b>	P	0	0	0	0	F	G	F	0	P	0	P	0	F	F	G
<b>17</b>	0	0	P	P	0	F	C	F	0	0	G	0	F	F	F	F
<b>18</b>	0	0	0	B	0	0	P	C	0	0	G	G	0	P	F	F
<b>19</b>	0	0	0	0	0	F	F	F	0	0	G	G	0	0	0	P
<b>20</b>	0	F	0	F	0	F	F	G	0	0	0	F	F	0	F	F
<b><i>EFF</i></b>	<b>55%</b>	<b>95%</b>	<b>60%</b>	<b>35%</b>	<b>75%</b>	<b>45%</b>	<b>30%</b>	<b>15%</b>	<b>100%</b>	<b>95%</b>	<b>60%</b>	<b>30%</b>	<b>45%</b>	<b>35%</b>	<b>10%</b>	<b>5%</b>

Santa Barbara County Regional IPM Coalition  
Pest Management Grants Agreement Number 01-019C

**Final Report - Attachment D: Model Policies**

## **REGIONAL IPM COALITION** **POLICY ADVISORY COMMITTEE**

### **Important Elements of an IPM Policy/Strategy**

This model policy is written to allow a school district, city or county government agency, or individual department to appropriate sections to meet their needs.

#### **Goals of an IPM Policy or Strategy:**

- Responds to needs of administrative and operational staff in charge of implementing pest management programs on public lands
- Responds to a broad range of concerns & needs of public – human health & safety, environmental quality.
- Addresses pest problems in a complex urban environment
- Provides institutional memory – consistent implementation over time
- Cost-effective

#### **Key Elements:**

- I. Rationale
- II. Purpose
- III. Definitions
- IV. Descriptions of roles and responsibilities
- V. Notification
- VI. Materials List and Exemption Process
- VII. Record Keeping
- VIII. Training
- IX. Program Review & Coordination
- X. Public Information
- XI. Reviewing Plans for New Construction and Landscape Projects
- XII. Contractors
- XIII. Precautionary principle

#### **Discuss for Each Element:**

- 1. Purpose/Objective of Element**
- 2. Expected Outcomes/Products**
- 3. Anticipated Barriers**
- 4. Examples from Other Policies**

#### **Model Language for City, County, or individual Department Policies:**

##### **I. Rationale/Philosophy/Mission Statement**

**Purpose/Objective of Element:** Identifies important concepts and approaches that will be employed in managing vegetation and pests. Sets the tone and direction for the policy and states why is this even happening?

**Model Language:**

It is the mission of the \_\_\_\_\_ (name of County, City, Department) to promote environmentally sensitive pest management while preserving assets and protecting the health and safety of the public and our employees. As part of this mission all costs and impacts associated with pesticide use, including community and environmental health, will be considered. The following IPM Policy describes the \_\_\_\_\_'s (County, City, Department) goals and demonstrates how the \_\_\_\_\_'s (County, City, Department) will achieve these goals.

## **II. Purpose**

**Purpose/Objective of Element:** Describes purpose and identifies the parties that are subject to the requirements of the policy.

### **Model Language:**

The purpose of this IPM Policy is to ensure that (County, City, Department):

- phases out the use of pesticide products that pose human health or environmental risks;
- promotes the use of non-hazardous and/or reduced risk alternatives that are protective of human health and the environment;
- applies pesticides in a manner that protects and enhances our region's natural resources and public health;
- use of pesticides is a model of environmental stewardship in the eyes of the public;
- establishes a leadership role in developing both aesthetically pleasing and ecologically sensitive landscapes and structures; and,
- observes a consistent standard of environmental stewardship by departments managing structures, landscapes, and other grounds.

This IPM Policy also provides for periodical re-evaluation of pesticides used by (County, City, District, Department) employees. This IPM Policy requires updates, which outline the pesticides that are being used in all County departments and will allow employees involved in pesticide use to make conscious decisions about the pesticides selected for use, to use pesticides wisely, and to make full use of pesticides purchased. All Departments that are responsible for managing construction projects; managing (County, City, Department)-owned structures, grounds, and landscapes; and purchasing and using pesticides are affected. In addition, all contractors that are applying pesticides on the (County's, City's, Department's) behalf will be required to subscribe to the IPM policy.

### **III. Definitions**

**Purpose/Objective of Element:** Provide definitions of IPM and other important terms and concepts to provide an explicit meaning and common understanding of the scope and intent of the specific actions required for developing and implementing IPM programs.

**Expected Outcomes/Products:** This information will facilitate effective communication between those affected by or interested in the policy.

#### **Model Language:**

##### ***Approved Pesticide List-***

A list of all pesticides which the Committee has approved for use along with any restrictions for such use. This list shall be referred to as the Approved Pesticide List (APL).

##### ***Contract-***

A binding written agreement, including but not limited to a contract, lease, permit, license or easement between a person, firm, corporation or other entity, including a governmental entity, and a department, which grants a right to use or occupy property of the \_\_\_\_\_ for a specified purpose or purposes.

##### ***Contractor-***

A person, firm, corporation or other entity, including a governmental entity, that enters into a contract with a department.

##### ***Emergency-***

An emergency pest outbreak that poses an immediate threat to public health or significant economic damage from failure to use a pesticide other than one on the approved materials list.

##### ***Exemption-***

A department may apply to the IPM Committee for an exemption for a particular pesticide banned by this policy. The application for an exemption shall be filed on a form specified by the IPM Committee and signed by the IPM Coordinator. The Committee may grant an exemption provided that the Committee finds that the department will use the pesticide for a specific and limited purpose and for a short and defined period and the department has identified a compelling need to use the pesticide.

##### ***Hazardous Material-***

A chemical or mixture that can pose a physical hazard, health hazard, or environmental hazard and that is regulated under the law to control its harmful effects. This definition is not intended to be rigid or legalistic because all materials regulated in this manner merit special attention and consideration under this program.

##### ***IPM Committee-***

The IPM Committee shall include a voting representative from all applicable departments/staff as designated by the heads of those departments, non-voting persons from the general public (minimum 2), and any non-voting IPM consultants or experts as deemed appropriate by the

members of the committee. This advisory committee shall be responsible for guiding the agency-wide implementation of the approved IPM policy. The IPM committee shall meet regularly.

### ***IPM Coordinator-***

An IPM Coordinator will be designated for those departments that apply pesticides in landscape or building settings. The (County, City, District) may appoint a person to coordinate these activities on a (County, City, District)-wide basis to serve as the primary point of contact. The IPM coordinator(s) shall be trained in the principles of low risk IPM, safe application of pesticides, and alternatives to pesticide use.

The IPM coordinator shall be responsible for:

- 1.) Coordinating efforts to adopt IPM techniques.
- 2.) Communication with all staff on the goals and guidelines of the program.
- 3.) Coordinating training programs for staff.
- 4.) Facilitating meetings with the IPM Committee.
- 5.) Tracking all pesticide use and ensuring that the material is available to the public.
- 6.) Presenting an annual report evaluating the progress of the IPM program.

### ***Integrated Pest Management (IPM)-***

A decision-making process for managing pests that uses monitoring to determine pest levels and tolerance thresholds and combines biological, cultural, physical and chemical tools to minimize health, environmental and financial risks. The method uses extensive knowledge about pests, such as infestation thresholds, life histories, environmental requirements and natural enemies to compliment and facilitate biological and other natural control of pests. The method uses the least toxic pesticides only as a last resort and includes the following guiding principles:

1. Monitor each pest ecosystem to determine pest population, size, occurrence and natural enemy population, if present. Identify decisions and practices that could affect pest populations. Records of all such monitoring shall be kept.
2. Set threshold and action levels. The threshold level refers to the point where a pest problem causes an unacceptable impact. The action level is the level of vegetation or pest population at a specific site at which action must be taken to prevent the population from reaching the threshold level.
3. Consider a range of potential treatments for the pest problem. Employ non-chemical management tactics first. Consider the use of chemicals only as a last resort, select and use the least toxic formulation effective against the target pest and use pesticides only in accordance with other provisions of this policy.
4. Monitor treatment to evaluate effectiveness. Such monitoring records shall be kept.
5. Ongoing education of the public.
6. Special circumstances, i.e. protection of botanical specimen, or other mitigating factors may allow exemptions to this process outlined above.

### ***Landscapes-***

Grounds that are actively managed such as parks, plantings and lawns around public buildings, right-of-ways, watersheds, etc., but not large tracts of forestland.

***Pesticide-***

Any substance, or mixture of substances, used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest which may be detrimental to vegetation, humans, or animals.

***Sustainable Design, Construction, and Maintenance-***

Principles, materials, and techniques that conserve natural resources and improve environmental quality throughout the life cycle of the landscape and its surrounding environment. Sustainable designs for buildings and landscapes incorporate methods that reduce the potential for pest problems from the start and with long-term maintenance needs in mind.

***Toxicity Category I Pesticide Product-***

Any pesticide product that meets United States Environmental Protection Agency criteria for Toxicity Category I under Section 156.10 of Part 156 of Title 40 of the Code of Federal Regulations.

***Toxicity Category II Pesticide Product-***

Any pesticide product that meets United States Environmental Protection Agency criteria for Toxicity Category II under Section 156.10 of Part 156 of Title 40 of the Code of Federal Regulations.



#### **IV. Descriptions of roles and Responsibilities**

**Purpose/Objective of Element:** Identification of special roles and responsibilities for implementing an agency's IPM policy. The number and type of roles needed depends on a variety of factors specific to the organization (e.g., size, structure, purpose).

**Expected Outcomes/Products:** Minimum recommended roles to define include:

- Department Head.
- Departmental IPM Coordinator (i.e., a person to oversee/support day-to-day functioning of the IPM Program)
- Agency-wide Advisory Committee (i.e., a group that represents all of the stakeholders in an IPM program; the committee serves as an intermediary between the staff and personnel responsible for implementing the IPM program, the IPM coordinator and the organizations governing body); they provide a review and recommendation function for implementing the IPM policy.
- A governing body (i.e., the group that determines and is responsible for an organization's policies, procedures, operational guidelines, etc. and their implementation. E.g. Board of Directors; School Board.)

#### **Model Language:**

##### **Department Heads**

Department heads shall be responsible for:

1. Ensuring that departmental procedures, budget, and staffing decisions support implementation of the IPM Policy.
2. Providing training to grounds management staff in the requirements of this IPM Policy.
3. Designating an Integrated Pest Management Coordinator to ensure products used by the department meet the standards outlined in this IPM Policy and represent the department on the IPM Committee.
4. At least annually and in conjunction with the IPM Advisory Committee, report to the agency's governing body on the department's implementation of the IPM policy.

## **Establishing an Integrated Pest Management Coordinator**

Each department or group of departments will be responsible for designating an Integrated Pest Management Coordinator. Departments will be responsible for providing Integrated Pest Management training opportunities for the Coordinator and other employees responsible for pest management. Other educational opportunities may also be provided as part of the quarterly meetings of the Grounds Management Committee.

The Coordinator will be responsible for:

1. Managing the IPM program of the department.
2. Selecting a location for any IPM pilot project to take place.
3. Reviewing requests for new products to ensure that the products meet the standards of the IPM Plan and submitting the product for review to the IPM Advisory Committee.
4. Attending meetings of the IPM Advisory Committee.
5. Presenting an IPM Implementation Plan to the Department Head for presentation to the Governing Body on an annual basis. The report should, at a minimum:
  - a) Identify the types of pest problems that the department has;
  - b) Identify the types and quantities of pesticides used by the department;
  - c) Identify the alternatives currently used for banned pesticides;
  - d) Identify the alternatives proposed for adoption within the next 12 months;
  - e) Identify any exemptions currently in place and granted during the past year
  - f) Identify planned changes to pest management practices
  - g) Evaluate the effectiveness of those changes
  - h) Identify other areas where successful changes will be implemented
  - i) Discuss any IPM Committee dissensions on any issues.

## **IPM Advisory Committee**

This advisory committee is responsible for:

1. Meeting on a regular basis to review and discuss pest management practices.
2. Develop, adopt and periodically review the approved materials list.
3. Review exemptions to the approved materials list.
4. Review emergency pest control decisions.
5. Provide comment on the IPM Implementation Plan.
6. Investigate low-risk/least hazardous alternatives to conventional treatments.
7. Assist departments in implementing the IPM Policy by developing educational information for staff and public users about IPM plans and programs.

The committee's role is supportive of the IPM coordinator and allows for a forum for public input. Any dissensions on any decisions should be noted and reported to the Governing Body in the annual IPM Implementation Plan report.

## **Governing Body**

The role of the Governing Body is to provide direction and support to the departments, review and commenting on the annual IPM Implementation Plan and considering public input.

## **V. Notification**

**Purpose/Objective of Element:** A system will be established to inform the public about site-specific pesticide use.

**Expected Outcomes/Products:** Posting and notification requirements; zone system

**Anticipated Barriers:** Costs to produce signs, consistency about sign usage, etc

### **Model Language:**

- (a) Any department that uses any pesticide shall comply with the following notification procedures:
  - (1) Signs shall be posted at least two working days before application of the pesticide product and remain posted at least three working days after application of the pesticide.
  - (2) Signs shall be posted (i) at every entry point where the pesticide is applied if the pesticide is applied in an enclosed area, and (ii) in highly visible locations around the perimeter of the area where the pesticide is applied if the pesticide is applied in an open area.
  - (3) Signs shall be of standardized designs that are easily recognizable to the public and workers.
  - (4) Signs shall contain the name and active ingredient of the pesticide product, the target pest, the date of pesticide use, the signal word indicating the toxicity category of the pesticide product, the date for re-entry to the area treated, and the name and contact number for the department responsible for the application.
- (b) Departments shall not be required to post signs in right-of-way locations that the general public does not use for recreational purposes. However, each department that uses pesticides in such right-of-way locations shall develop and maintain a public access telephone number or web site about pesticide applications in the right-of-way areas. Information readily available by calling the public access number or accessing the web site shall include for any pesticide that will be applied within the next three days or has been applied within the last four days: A description of the area of the pesticide application, the name and active ingredient of the pesticide product, the target pest, the date of pesticide use, the signal word indicating the toxicity category of the pesticide product, the re-entry period of the area treated and the name and contact number for the City department responsible for the application. Information about the public access telephone number shall be posted in a public location at the department's main office building.
- (c) Departments may obtain authorization from the Committee to apply a pesticide without providing a three-day advance notification in the event of a public health emergency or to comply with worker safety requirements. Signs meeting the requirements of Subsection (a)(2) through Subsection (a)(4) shall be posted at the time of application and remain posted four days following the application.

- (d) The Committee may grant exemptions to the notification requirements for one-time pesticide uses and may authorize permanent changes in the way City departments notify the public about pesticide use in specific circumstances, upon a finding that good cause exists to allow an exemption to the notification requirements. Prior to granting an exemption pursuant to this subsection, the department requesting the exemption shall identify the specific situations in which it is not possible to comply with the notification requirements and propose alternative notification procedures. The Committee shall review and approve the alternative notification procedures.
- (e) Departments are responsible for making pesticide use information available to staff and the public upon request. A list of all materials applied on a site-specific basis shall be maintained by the department. This list shall be available on site or made available to the public upon request.

## **VI. Materials List and Exemption Process**

**Purpose/Objective of Element:** Identifies products that are eligible or restricted for use and, if appropriate, a method for allowing exemptions.

**Expected Outcomes/Products:** An agreed upon materials list and exemption process.

**Anticipated Barriers:** Disagreement on what should be included/excluded from the list, costs of evaluating new materials, and conflicting scientific studies.

### **Model Language:**

The IPM Committee shall adopt an approved list of pest control materials/products for use by the \_\_\_\_\_ (name of County, City, Department). Material selection will be based on IPM Committee review of the product's contents, precautions, need for the product, and adverse health effects. The IPM Committee will make product recommendations and establish and Approved Use List. The list shall be submitted as part of the annual report to the jurisdiction's governing body. If the use of a material not on the Approved Use List, the IPM Coordinator may apply for an emergency exemption.

Criteria for developing materials lists shall be based on acute and chronic toxicity of products. Environmental impacts of the products shall also be considered. The approved materials list shall screen pesticides for the following human risk parameters:

**A. Acute Toxicity:** The potential for a pesticide to cause immediate harm.

#### **1. Hazard Category**

Each pesticide product registered by EPA is assigned a hazard category I, II, III, or IV by the Agency based on characteristics of the full product formulation, including acute toxicity, and skin and eye irritation. In evaluating the acute data, EPA assigns the hazard category based on the greatest hazard, i.e. ingestion, inhalation, skin absorption, eye irritation, etc.

The table below shows the toxicity ranges that apply for each category. (Note: LD50 indicates lethal dose 50%; LC50 indicates lethal concentration 50%.) A relatively non-toxic product (via ingestion, inhalation, or skin absorption) could be placed in the highest hazard category merely on the basis of extreme eye irritation. Products in category I are most hazardous and bear the signal word DANGER on their labels. Those in category II are labeled WARNING. Both category III and IV products are labeled with CAUTION. Product category was determined from label signal words, and category III and IV products were not distinguished from each other.

<b>EPA Category</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>
<b>Signal Word</b>	<b>DANGER</b>	<b>WARNING</b>	<b>CAUTION</b>	<b>CAUTION</b>
Oral LD50 (mg/kg body wt)	Less than 50	Between 50 and 500	Between 500 and 5000	More than 500
Inhalation LC50	Less than 0.2	Between	Between	More than

(mg/liter air)		0.2 and 2	2 and 20	20
Dermal LD50 (mg/kg body wt)	Less than 200	Between 200 and 2,000	Between 2,000 and 20,000	More than 20,000
Eye Effects:	Corrosive Non-reversible opacity	<i>Severe irritation</i> Reversible opacity persisting 7 days	Moderate irritation No opacity Reversible 7 days	No irritation
Skin Effects:	Corrosive	Severe irritation	Moderate irritation	Mild irritation

## 2. *Restricted Use Pesticides:*

Some pesticides are restricted to use only by certified pesticide applicators and are not available to the general public because of high toxicity, particularly hazardous ingredients, or environmental hazards. Pesticides designed as restricted use are indicated as such in this analysis. The source of information was the product label.

**Chronic Toxicity:** The ability of the pesticide to cause long lasting harm.

## 3. *Carcinogens (active ingredients only):*

Sources of information:

### A. US EPA

Known/Likely

Likely

Cannot be Determined

Not Likely

*Resource: US EPA, Pesticidal Chemicals Classified as Known, Probable or Possible Human Carcinogens, <http://www.epa.gov/pesticides/carlist/table.htm#a>*

### B. "Chemicals known to the State of California to cause cancer or reproductive toxicity."

*Resource: State of California list of carcinogens, reproductive toxicants  
://www.oehha.org/prop65/41699ntc.htm*

### C. National Toxicology Program (NTP)

Known to be human carcinogens

Reasonably anticipated to be human carcinogens

*Resource: National Toxicology Program, Report On Carcinogens, 8th Edition, <http://ntp-server.niehs.nih.gov/NewHomeRoc/CurrentLists.html>*

### D. International Agency for Research on Cancer (IARC)

Group 1 - carcinogenic to humans

Group 2A - probably carcinogenic to humans

Group 2B - possibly carcinogenic to humans

Group 3 - not classifiable as to its carcinogenicity

Group 4 - probably not carcinogenic to humans

*Resource: International Agency for Research on Cancer, IARC Monographs Programme on the Evaluation of Carcinogenic Risks to Humans, Complete List of Agents, Mixtures and Exposures Evaluated and their Classification, <http://www.iarc.fr/>*

#### **4. Reproductive/Developmental Toxicants (active ingredients only):**

"Chemicals known to the State of California to cause cancer or reproductive toxicity."

*Resource: State of California list of carcinogens, reproductive toxicants  
<http://www.oehha.org/prop65/41699ntc.htm>*

#### **5. Endocrine Disruptors: (active ingredients only)**

Materials with the ability of certain chemicals to mimic or block the effects of hormones in humans and other wildlife. Because of the similarity of the endocrine system across many species, its critical role in development and reproduction, and its extreme sensitivity to very low levels of hormone-like compounds, there is the potential for endocrine disrupting substances in the environment to adversely affect wildlife and humans.

Although the science is relatively new and in many cases highly controversial, considerable evidence of effects in wildlife and some evidence in humans has caused many scientists to warn of potential dangers from exposure to endocrine disrupting chemicals. Under the Food Quality Protection Act, the EPA is required to screen pesticide ingredients for endocrine system effects. Until that screening is done, a comprehensive list of endocrine disruptors will not be available.

*Resource: State of Illinois Environmental Protection Agency list of known, probable, or suspected of causing endocrine system effects (Illinois EPA Endocrine Disruptors Strategy, February 1997.).*

**Emergency exemption.** A department may apply to the Committee for an emergency exemption in the event that an emergency pest outbreak poses an immediate threat to public health or significant economic damage will result from failure to use a pesticide other than one on the approved materials list. An application for an exemption shall be filed on a form specified by the Committee. The Committee shall respond to the application in a timely manner. If the requesting department is unable to reach the Committee, the IPM Coordinator may authorize the one-time emergency use of the required pesticide. The IPM Coordinator must notify the Committee members of the determination to use the pesticide prior to its application in the event that the IPM Coordinator is unable to make the request at the Committee meeting. Signs shall be posted at the time of application and remain posted four days following the application. The Committee may impose additional conditions for emergency applications.

## **VII. Record Keeping**

**Purpose/Objective of Element:** A system of record keeping will be developed that allows for reporting to appropriate agencies as required by law; decision makers; and the general public/interested persons. Also provides information for effective program evaluation and improvement.

**Expected Outcomes/Products:** Annual report detailing the levels of pesticide use

**Anticipated Barriers:** Person-power, computer expertise, confusing aspects of data related reports.

### **Model Language:**

- (a) Each department that uses pesticides shall keep records of all pest management activities. Each record shall include the following information:
  - (1) The target pest;
  - (2) The type and quantity of pesticide used;
  - (3) The site of the pesticide application;
  - (4) The date the pesticide was used;
  - (5) The name of the pesticide applicator;
  - (6) The application equipment used;
  - (7) Prevention and other non-chemical methods of control used;
  - (8) Experimental efforts; and
  - (9) Exemptions granted for that application.
- (b) Each department that uses pesticides shall maintain a pest management record as a part of their Integrated Pest Management Plan and provide it to the governing body when requested.
- (c) Pest management records shall be made available to the public upon request. Site by site pesticide use records shall be made available to the public upon request.



## **VIII. Training**

**Purpose/Objective of Element:** To provide training as needed for implementation of the IPM program

**Expected Outcomes/Products:** Annual training schedule

**Anticipated Barriers:** Staff time, scheduling conflicts, costs of training materials/instructors

### **Model Language:**

Increasing knowledge of staff and contractors who design and maintain buildings and landscapes is critical to the success of the IPM Program. Consequently, providing ongoing training and educational opportunities to city staff and contractors regarding building and landscape IPM concepts, practices, and products will be a priority.

The \_\_\_\_\_ shall invite speakers to quarterly meetings or arrange for other educational opportunities to assist departments in implementing this IPM Program. Department directors shall ensure that IPM Coordinators inform employees on departmental policies and procedures relevant to this IPM Program and keep staff current with best landscape-management practices and technologies that utilize Integrated Pest Management. Department directors shall also support employee involvement in identifying and implementing strategies to minimize the use of pesticides and in evaluating replacements to chemicals targeted for phase-out.

- All staff associated with planning, design, construction, and maintenance of buildings and landscapes shall receive an orientation to the IPM Policy and Program and their roles and responsibilities in implementing it in a written or verbal format.
- All personnel involved in pest management activities shall receive training on:
  - An orientation to the Landscape IPM Policy and Program;
  - Identification and lifecycles of typical southern California pests, weeds and beneficial insects; determining threshold levels for different types of landscapes; monitoring techniques; and strategies for successful management of these pests;
  - Noxious weed identification, control, and regulations;
  - Pesticide laws and safety;
  - Specific Best Management Practices as appropriate.

Training will be provided by City/County staff, IPM consultants, IPM Technical Advisors, and invited guest speakers. The IPM Coordinator with assistance from the IPM Committee will schedule training. Training and educational opportunities, both formal and informal, will also occur at quarterly landscape staff meetings. Managers and Supervisors are not only expected to participate in the training, but to fully support involvement of their staff and contractors in the training.

In making landscaping staffing and budget decisions, departments shall consider the potential environmental tradeoffs; for example, will reduced staffing require increased use of pesticides to maintain the landscape at the same standard? Will short-term IPM expenditures result in long-term savings?

## **IX. Program Review & Coordination**

**Purpose/Objective of Element:** to provide annual review of the program to the public and legislative bodies.

**Examples from Other Policies:**

**Model Language:**

### **Tracking Progress and Evaluating the Program**

Annually, the Committee will conduct a survey to gather information for the Annual IPM Summary. In addition, each department will submit a summary of the previous year's pilot projects, a timeline for implementing viable changes at other sites if funded, and plans for any new pilot projects including changes that can be implemented in the next Fiscal Year and a timeline for their implementation, if funding support is provided. The Committee shall compile this information and any recommendations for future direction of the program and shall submit the report to the \_\_\_\_.

**X. Public Information**

**Purpose/Objective of Element:**

**Expected Outcomes/Products:** Appropriate signage or other method for reporting pesticide use to site users.

**Anticipated Barriers:**

**Model Language for City, County or Departmental Policies:**

Efforts will be made to educate the public about the reduced risk pest management goals and practices implemented under this policy in the most effective manner given time and budget constraints.

## **XI. Reviewing Plans for New Construction and Landscape Projects**

**Purpose/Objective of Element:** To ensure that new construction projects incorporate design features that minimize pesticide use and requirements.

**Expected Outcomes/Products:** Design guidelines, similar to the green guidelines, for new projects, etc.

**Anticipated Barriers:** Additional time in designing project, lack of availability of appropriately training designers.

### **Model Language:**

Conventional landscapes require intensive maintenance and rely more heavily on pesticides for pest control than landscapes created with integrated pest management design specifications.

Departments participating in a (city, county, department) project that designs a new landscape or renovates an existing one shall submit design and construction plans to the IPM Coordinator for the department. The IPM Coordinator will work with the “requestor of the plan” and engineering staff to ensure that, where possible, the design considers IPM measures. The purpose is to evaluate and make recommendations regarding IPM design specifications. Boilerplate specifications will be developed as a tool for designers, (city, county, department) staff, and contractors to reference when planning for inclusion of IPM design criteria.

In planning, designing, and installing landscape owned and managed by the (city, county, department), site objectives shall include future management and maintenance practices that protect and enhance natural ecosystems. A landscape, facility, or road right-of-way should be planned and designed taking into account parameters that will enhance intended use of the land and minimize pest problems. Design takes into account such factors as types of uses, soils, grading and slope, water table, drainage, proximity to sensitive areas, selection of vegetation, and vector control issues. (City, County, Department) grounds designers, planners, managers, crews, and their contractors shall give priority to IPM strategies when designing new and renovating existing landscaped areas. These include:

- Using proper soil preparation and amendment;
- Specifying weed-free soil amendments;
- Using mulches to control weeds, conserve water, and build healthy, biologically diverse soils;
- Using site adapted and pest resistant plants: “the right plant for the right place”;
- Grouping together plants with similar horticultural needs;
- Retaining and using regionally native trees, scrubs, and perennials where appropriate;
- Controlling noxious weeds and invasive, non-native plant species;
- Planting for erosion and weed control;
- Assessing whether landscapes can still meet the intended site use objectives while modifying the aesthetic standard and/or applying less maintenance; and
- Matching maintenance standards to site objectives in the design stage;
- Constructing walkways so as to prevent weed intrusion;

- Planting vegetation that will encourage the presence of beneficial insects and birds.

## **XII. Contractors**

**Purpose/Objective of Element:** Since there is potential for a large portion of pest management to be performed by contractors, it is important for contractors to know, understand and adhere to the requirements of any adopted IPM policy.

**Expected Outcomes/Products:** Guidelines for contractors

**Anticipated Barriers:** Enforcement, accountability

### **Model Language:**

When a department enters into a new contract or extends the term of an existing contract that authorizes a contractor to apply pesticides to property, the contract shall obligate the contractor to comply with all provisions of this IPM Policy. In addition, the contractor shall submit to the \_\_\_\_\_ (City, county or department) an IPM implementation plan that lists:

- the types and estimated quantities, to the extent possible, of pesticides that the contractor may need to apply to property during its contract,
- outlines actions the contractor will take to meet the IPM Policy to the extent feasible, and,
- identifies the primary IPM contact for the contractor.

A contractor, or department on behalf of a contractor, may apply for any exemption authorized under the exemptions section of this policy.

**XIII. Precautionary principle****Purpose/Objective of Element:****Expected Outcomes/Products:****Anticipated Barriers:****Model Language:**

It is the policy of the (city, county, department) to adopt, properly implement and practice low risk/least hazardous Integrated Pest Management, with the goal of immediately minimizing the risk of pesticide exposure to staff and public. This policy is based on what is referred to as the 'Precautionary Principle' of pest management. The guiding principles in this policy are based on the following: (1) No pesticide is free from risk or threat to human health, (2) all reasonable alternative measures of pest management have been attempted and have been shown, and documented in writing, to be unsuccessful, and (3) pesticides suspected of being in conflict with the mission and goals of this policy shall not be used without special approval, or until it is determined that a specific product is safe for use around sensitive individuals (i.e. children, elderly, asthmatics, etc.).

The Precautionary Principle should guide decision-making processes when it comes to the health and safety of staff and public. All aspects of the program will be in accordance with federal and state laws and regulations and county policies. All departments within the (city, county, department) must conform to the following IPM policy.

## **ATTACHMENT E: Results of Participants Survey**

The following information is based upon 15 pre-program and 17 post-program surveys, although not necessarily from the same jurisdictions. The data does fairly represent the views of the participating Coalition partners.

### **Pre-program survey:**

Jurisdictions represented:

School district: 4      Park department/district: 8      College: 3  
High-use, managed landscape acres represented: 2,627 acres  
Average number of acres per employee: 14.5 acres per employee

*Ranged from 43 acres per employee high (a park system) to 1.6 acres per employee low (intensive organic mini-farm on college campus)*

Number with guiding documents (policy/strategy/administrative guidelines)

Approved: 4  
Drafted: 2  
Informally practiced: 9

### **Post-Program Survey:**

Jurisdictions represented:

School district: 4      Park department/district: 6      College: 4  
Other (regulator, land trust): 3

*"Have you implemented, or do you plan to implement, any reduced risk management practices based upon information received through this program?" **100%***

*High-use, managed landscape acres represented: **2,197 acres** (87% of pre-program survey acreage)*

*"Approximately what percentage of your landscape areas do you now, or do you plan to manage using reduced risk practices gained from this program?" **87%***

*"If the Regional IPM Coalition can be funded again in the future, would you try to actively participate?" **Yes: 94%; Maybe: 6% (1 response); No: 0%***

*Desired future activities:*

- More round-table training sessions
- Development of IPM spec. sheets for renovation, hardscape installation, etc.
- Further development of the Zone Management system
- More on-site tours
- Equipment exchange/joint purchasing

*What elements of the Regional IPM Coalition would you like to see improved in the future?*

More on organic management, more on non-chemical pest control.

Santa Barbara County Regional IPM Coalition

Pest Management Grants Agreement Number 01-019C

Final Report - Attachment F:  
City of Santa Maria Landscape Standards

This document has been provided by the City of Santa Maria Parks and Recreation Department, most notably Alex Posada (Director of Recreation and Parks), Glenn Franklin (Park Services Manager), Patty Ellis, and Louie Raygoza. The document was honored with an Award of Excellence from the California Parks and Recreation Society.

The authors hope that other communities may benefit from this document, and only request that any improvements upon it be sent back to the authors so they may in turn benefit from the efforts of others. Comments may be directed to Glenn Franklin ([gfranklin@ci.santa-maria.ca.us](mailto:gfranklin@ci.santa-maria.ca.us)).



## GENERAL

### Description

Landscape maintenance preserves and sustains the quality of a landscape. Landscapes are generally designed with a given style, formal or informal. Proper maintenance maintains the intended design concept.

### Work Included

A working knowledge of the maintenance of plantings, irrigation and drainage systems, debris removal, and other related work.

### Quality Assurance

Contractor must be properly licensed and registered to perform pest control work described below.

### Site Conditions

Existing conditions Contractor shall inspect the entire site and be familiar with the requirements and growth habits of all existing plant material.

**Environmental conditions** Contractor shall immediately advise the Recreation and Parks Department of disease or pest problems and any other conditions, which may be detrimental to the condition of the landscape or fixtures therein.

### Scheduling

Maintenance services shall be provided on a weekly basis, Monday through Saturday, between the hours of 7:00 a.m. and 6:00 p.m.

### Warranty

A. Contractor shall furnish all supervision, labor, materials, and equipment necessary for the complete maintenance of all landscaped areas.

B. Plant materials shall be maintained in a healthy and vigorous condition, irrigation and drainage systems kept in good working order, and the general site kept clean, and free of litter, debris, or graffiti.

C. Contractor shall restore or replace any trees, shrubs, ground covers, lawn, perennials, annuals, or irrigation components damaged by contractor's action or lack of action.

D. Contractor **shall not** be responsible for the following, unless specifically agreed upon:

1. Pruning and pest control of trees exceeding 15 feet in height;
2. Replacement of plant material damaged or destroyed by storms, or other causes beyond the contractor's control;
3. Thatching of turf grass areas

### Equipment

Contractor shall provide and maintain all equipment necessary to properly complete the maintenance work. Equipment shall be safe, proper, efficient, and suited to, and for, the job. All cutting blades shall be kept properly sharpened. All equipment must have all required safety devices in place and in operation.

## PRODUCTS

### Fertilizers

Commercial fertilizers may be pellet, tablet, granular, or liquid form and must conform to the requirements of the California Food and Agriculture Code and approved by the Recreation and Parks department. Choice of fertilizers shall be based on soil fertility tests and/or the specific plant requirements.

### **Pesticides**

When ever possible, integrated pest management (IPM) should be used. All pesticides MUST be registered in the State of California and conform to all requirements of the California Food and Agriculture Code.

### **Herbicides**

Least toxic products shall be considered. All herbicides MUST be registered in the State of California and conform to all requirements of the California Food and Agriculture Code.

### **Growth Regulators**

Growth regulators must be registered in the State of California and conform to all requirements of the California Food and Agriculture Code.

## **EXECUTION**

### **Trees**

#### **A. Pruning**

All trees pruning / trimming and other procedures shall be under the strict guidelines of the International Society of Arboriculture.

1. All trees shall be allowed to grow to their natural genetic form and size, unless specifically excepted.

2. Tree pruning shall have two basic objectives: to promote structural strength and to accentuate the natural form and features of the tree.

3. The primary pruning of deciduous trees shall be done during the dormant season. Damaged trees or those that constitute health or safety hazards shall be pruned at any time of the year, as required.

4. Under no circumstances shall mature trees be topped nor shall young trees be stripped of lower branches ("raised up"). Lower branches shall be retained in a "tipped back" or pinched condition with as much foliage as possible to promote callipered trunk growth ("tapered trunk"). Lower branches shall be cut off only after the tree is able to stand erect without staking or other support.

5. Trees with a strong central leader and conical (pyramidal) shape generally need little or no pruning. As a rule, the single central leader shall never be radically topped or cut back.

6. Trees with multi-leaders or a branched main trunk system shall be pruned to select and develop permanent scaffold branches, which have vertical spacing from 18 to 24 inches and radial orientation so as not to overlay one another. This is done to eliminate narrow, V-shaped branch forks that lack strength, to maintain growth within space limitations, and to maintain a natural appearance.

7. Conifers shall be thinned out and shaped only when necessary, to prevent wind and storm damage.

8. Proper side branch removal requires cutting at the main trunk just beyond the branch bark ridges.

9. All suckers and water sprouts and crisscrossing dead, diseased, broken, and heavy-laden side branches shall be removed to thin crown for less wind resistance.

#### **B. Irrigation**

1. Trees have deep root systems. Soil conditions shall be monitored closely for both under- and over-watering.

2. Frequency and duration of irrigation shall be dictated by the requirements of the specific trees.

3. All trees shall be probed with a soil-sampling probe to a depth of 24 inches at The contractor shall maintain log sheets for periodic review by the Recreation and Parks Department. least every 45 days to ascertain the subsoil conditions. The contractor shall maintain log sheets for periodic review by the Recreation and Parks Department. A saturated condition is an indication of drainage problems or excessive irrigation and shall be corrected as soon as possible.

#### C. Fertilization

1. Most trees shall be fertilized annually, in the spring, with a complete fertilizer. The contractor shall maintain log sheets for periodic review by the Recreation and Parks Department.
2. Fertilization of mature trees shall be required only if the trees show a definite need for fertilization.
3. Apply fertilizer around the tree, approximately halfway between the base and drip-line, at a rate of one-half pound of actual nitrogen per inch of trunk diameter measured at four feet above the soil surface.

#### D. Staking and Guying

1. The purpose of staking and guying trees is to support and protect young trees until such time as they can stand-alone.
2. All tree stakes, guys, and ties shall be maintained to properly support the tree and shall be inspected every 90 days, to prevent girdling or chafing of trunks or branches or rubbing that may cause bark wounds. The contractor shall maintain log sheets for periodic review by the Recreation and Parks Department.
3. Stakes and guys shall be removed when no longer required for support.

#### E. Tree wells

1. Bare soil wells shall be maintained around all trees. A circle with a radius of 12 inches beyond the bark of the tree shall be maintained free of grass, ground covers, and weeds.
2. Grasses and weeds shall be removed or sprayed with a contact herbicide (see Weed Control).

#### F. Records

1. Contractor shall provide the Recreation and Parks Department monthly documentation of any tree care tasks completed, for entry in the Urban Forest inventory system.

### **Shrubs and Vines**

#### A. Pruning

1. The general objectives for pruning of shrubs and vines are to maintain growth within space limitations, to maintain a natural appearance, to eliminate diseased or damaged growth, and to select and develop permanent branches.
2. General pruning shall be done in late winter. Minor pruning may be done at any time.
3. Shrubs shall be pruned to conform to the design concept of the landscape.
4. Individual shrubs shall not be clipped into balled or boxed forms.

5. Vines shall be pruned to control growth and direction, and shall be kept “in-bounds” and not allowed to grow over windows, doors, gates, or other structural features.

6. All pruning cuts shall be made to lateral branches or buds or flush with trunk or main stem. Pinching or light heading back of terminal buds on selected shrub species promotes bushiness. To prevent legginess (sparse lower branches), shrubs shall be maintained with the lower foliage wider than the upper foliage. This practice allows more light to reach the lower foliage.

#### B. Irrigation

1. Frequency and duration of irrigation shall be dictated by the specific requirement of the shrubs and vines.
2. Soil moisture checks of representative plants in the landscape shall be made bimonthly, using a soil-sampling probe or other approved tool.
3. Consideration shall be given to the ground covers growing in shrub areas. Irrigation scheduling shall be based on the requirements of the shallowest rooted plants in the area.

#### C. Fertilization

1. Most shrubs and vines shall be fertilized annually. Plants that have reached maturity may not require annual fertilization. Plants requiring continual or annual pruning, due to space limitations or espaliering, may require more frequent fertilization.
2. All actively growing plants not yet at maturity shall be fertilized once per year in the spring (March or April). Apply an appropriate slow-release, long-lasting nitrogen fertilizer, controlled-release fertilizer, or plant tablets at the manufacturer's recommended application rate.

### Ground Covers

#### A. Edging

1. Established ground covers bordering sidewalks or curbs shall be edged as often as necessary to provide a clean, crisp line at all times.
2. Ground covers shall not be allowed to touch or cover the crowns of shrubs and trees.

#### B. Irrigation

1. Ground covers shall be irrigated according to the water requirements of the plants. Because both trees and shrubs are often planted in ground cover areas, irrigation shall be made with the water requirements of all plants considered.
2. Moisture checks shall be made periodically by use of a soil probe in various ground cover areas. These checks shall be used as a guide in water requirements.

#### C. Fertilization

1. Fertilization shall coincide with the ground cover growing season. One application of a complete fertilizer applied in the spring, per manufacturer's recommended application rate, is generally adequate for established ground covers.
2. Young or sparse ground cover areas require a minimum of two applications of fertilizer: one in early spring and again in late spring or early summer.

#### D. Renovation

1. Ground covers will develop a thatch layer with age. This mat of old stems (thatch) is not only unsightly, but harbors a great number of insects, rodents, and other undesirable pests.

2. Renovation of ground covers shall be done at the end of the dormant season, and will reduce the thatch and revitalize the appearance of the ground cover. This is usually accomplished by top mowing at a height no less than 4" (dependent on type of ground cover).

#### E. Coverage

In order to establish complete coverage within a maximum of two growing seasons, ground cover plantings shall be kept healthy and actively growing with proper irrigation and fertilization.

### **Lawns**

#### A. Mowing

1. Lawns shall be mowed weekly, to provide a neat appearance.

2. As a general rule, warm season grasses are mowed shorter than cool season grasses. Begin mowing at one-half inch in the spring and slowly adjust to one inch by late summer and early fall. Avoid scalping during the growing season.

3. Clippings shall either be caught or vacuumed from the lawns.

#### B. Edging

1. All lawn edges along sidewalks and curbs, as well as shrub or ground cover border areas, shall be edged at least every two weeks during the active growing season, March through October, and as required for appearance for the remainder of the year.

2. Edging shall be performed with a blade type mechanical edger. The cut edge shall appear as a clean, smooth line.

3. Obstacles within the lawn areas shall be edged to maintain a grass-free clear space of two inches in width.

4. Lawn sprinkler heads shall only be edged to allow for proper distribution of water.

#### C. Irrigation

1. Lawns shall be irrigated at such frequency, as weather conditions require. Soil moisture within the root zones shall remain constant and adequate during the growing season.

2. Lawns shall not be watered on the day prior to mowing. Wet soil conditions usually promote disease and soil compaction.

3. Lawns shall be irrigated at night or early morning. Wherever possible, intermittent applications during the irrigation period shall be used to increase penetration, eliminate runoff, and comply with City of Santa Maria regulations.

#### D. Fertilization

1. A balanced (15-15-15) fertilizer shall be applied at least four (4) times per year

2. Fertilizers shall be applied per the manufacturer's recommendations.

3. Quarterly records detailing fertilization shall be provided to the Recreation and Parks Department

### **Irrigation Systems**

#### A. General

1. Proper irrigation system maintenance shall include the overall supervision of the system, controller scheduling, routine adjustments, and necessary repairs.
2. Failure of the system to provide full and proper coverage shall not relieve the Contractor of providing adequate coverage.

#### **B. Controller Scheduling**

1. A qualified person shall be completely responsible for operating the irrigation systems, with the duties of adjusting controllers, observing the effectiveness of the irrigation system, and making minor adjustments to the system.
2. The irrigation programs shall be adjusted to conform to plant requirements, soil and slope conditions, weather, and change of season, within the limitations of the system.
3. Water shall not be applied at a rate higher than the infiltration rate of the soil or as dictated by the Recreation and Parks Department
4. A soil sampling probe and/or tensiometer shall be used regularly to evaluate actual soil moisture levels and irrigation schedule.
5. Automatic irrigation controllers shall be rescheduled, as necessary, to avoid water waste and runoff, and shall be turned off during periods of rain.
6. In windy areas the controllers shall be set to operate during periods of low wind velocity.
7. Watering schedules shall be arranged so as not to interfere with the use of any facilities as approved by the Recreation and Parks Department.
8. A chart shall be maintained inside of each controller to record current irrigation programs including day, times, and length of watering for each station and program for each controller. A copy of all charts shall be made available to the Recreation and Parks Department.

#### **C. System Maintenance**

1. The irrigation system shall be maintained for optimum performance. This shall include cleaning and adjusting all sprinkler heads and valves for proper coverage.
2. Inspections of the irrigation system, in operation, shall be made weekly or as needed during summer months, April through October, and biweekly November through March, to detect any malfunctioning of the system.
3. All malfunctioning equipment shall be repaired prior to the next scheduled irrigation.
4. All replacement heads or parts shall be of the same manufacturer, type, and application rates as approved by the Recreation and Parks Department

### **Drainage Systems**

A. Good drainage is essential for healthy and vigorous plant growth, and systems must be routinely checked for blockage, which could cause ponding, flooding, and excessive saturation of the soil and plant root zones.

B. Surface drainage swales and / or gutters shall be kept free of leaves, debris, and sediment accumulations.

C. Underground drainage systems shall be flushed with water at least twice a year, summer and winter, to avoid plugged pipes.

### **Disease and Pest Control**

A. All chemicals **MUST** be applied under the strict supervision of a California Department of Pesticide Regulation licensed and qualified pest control applicator, per the manufacturer's recommended label application procedures, and the laws regulating pesticide application. Integrated pest management (IPM) shall be used whenever possible and least toxic materials used.

B. Plants and lawns shall be maintained in healthy condition such that they are able to withstand minor disease and insect damage without controls. Routine applications of pesticides are not permitted, as this practice destroys natural predator-prey relationships in the environment.

C. In general, incidence of serious disease and insect problems shall be minimized by proper fertilization and irrigation practices.

D. Where unusually high infections or infestations occur, an accurate identification of the disease or insect shall be made and the control product selected with care, prior to application.

E. Insecticidal soaps shall be utilized whenever possible.

F. Snails and slugs shall be controlled with recommended baits and sprays.

G. Rodents such as gophers and moles shall be trapped or controlled with approved baits.

H. A monthly record

## **Weed Control**

A. Use of Herbicides – Herbicides may be used to control and inhibit weed growth, but must be selected with extreme care. Pre-plant, pre-emergent, contact, and translocation herbicides are available. Some herbicides can cause damage to plant material. Herbicides must be applied in strict accordance with manufacturer's label application procedures.

B. Tree Wells – Contact herbicides may be used to control the growth of weeds and grasses in tree wells but shall not be used more than once a month. Avoid spray contact with the tree bark. Pre-emergent herbicides may be used. Caution must be exercised to avoid damage to adjacent lawns or ground covers.

C. Shrub and Ground Cover Areas – Shrub and ground cover areas shall be maintained free of weeds and grasses. Herbicides may be used to control weed growth. Careful consideration shall be given to the choice of materials used, since some herbicides do damage to turf grass and some ground covers. Contractor shall use caution in application in areas adjacent to lawns or ground covers.

### **D. Lawns**

1. Weeds infestations shall be discouraged by proper maintenance, including but not limited to proper mowing, proper watering, and proper fertilization.

2. Any and all deficient practices shall be corrected.

3. Before selecting and applying herbicides to lawns, the type of weed shall be carefully identified.

4. Herbicides shall be used as little as possible. Only when necessary shall herbicides be used as a means of swinging the weed-grass competition in favor of the turf grass.

E. Other Weed Control – Weeds shall not be allowed to grow in paved areas such as driveways, curbs, walks, and paths. Weeds can be removed manually or herbicides may be used for control. The use of weed oil, diesel fuel, or other staining or damaging materials is not allowed. Dead weeds shall be removed from all pavements.

## **Debris Removal**

A. Litter and trash including but not limited to leaves, rubbish, papers, bottles, cans, and other debris shall be removed from all areas of the site on a weekly basis.

B. Graffiti shall be removed as reported, using paint or approved remover. Only paint matching the existing surface shall be used. Graffiti shall be block painted to maintain appearance ( no blotches or patches) .

C. All refuse from the maintenance operation shall be disposed of properly.



## INTRODUCTION

The purpose of these Standards is to provide a uniform design theme for the landscaping within the City of Santa Maria, including the Landscape Maintenance Districts, which will serve as a buffer between the street and adjacent land uses, and provide a pleasant visual experience for the pedestrian and motorist. The desire for all landscape projects is to carefully integrate community needs, environmental conditions and natural resources into a network of functional and aesthetic streetscapes, parks, open space areas, medians and roundabouts that require appropriate amounts of maintenance and supplemental irrigation.

The property owners and/or Developers, at such time as they wish to develop their property, will provide a landscape and pedestrian easement or dedicate public right-of-way along the designated frontages of certain arterial and collector streets as determined by the City of Santa Maria. Within this easement or, right-of-way, landscaping and sidewalk will be installed. The installation will be required of the property owner through the subdivision process, the development review process, and through the requirements of Chapter 44 of Title 12 of the Municipal Code.

The design and implementation of a project's landscape design should address all functional and aesthetic site specific design issues. The intent is to establish landscaping that is aesthetically pleasing but not labor intensive. Sustainable landscaping is a condition of requirement. Sustainable landscaping includes native and introduced plants that are well suited to existing light, soil and moisture conditions, coupled with low requirements of labor, fertilizers and pesticides to thrive. All plans shall be designed with the knowledge that the plant material will be maintained in an informal style, allowing room for the plants to grow and develop natural growth habits without creating physical or visual obstacles or hazards. All plans shall integrate the project into the immediate surroundings and adjacent properties.

The maintenance of public easement landscaping along residential property and within retardation basins will be funded through a Landscape Maintenance District. Maintenance of commercial and industrial landscape easement property, including basins, will remain the responsibility of the property owner. For commercial property that includes landscaping in the public right-of-way (i.e., medians or roundabouts) these will be maintained through a Landscape Maintenance District. - Acceptance into a District shall be completed prior to recordation of the final map. No certificate of occupancy (temporary or permanent) shall be issued until the Petition Requesting Annexation has been signed and returned to the Recreation and Parks Department.

All new construction shall conform to the requirements of this manual and, in addition, is subject to at least a one-year installation guarantee for both the landscape and irrigation. The installation shall conform to the City-approved landscape plan. The owner shall guarantee all planting and irrigation equipment for one full year after written

acceptance of the installation by the Recreation and Parks Department. The rate of growth and establishment of all planting will be monitored by the Recreation and Parks Department. If plants do not grow in a manner typical of their species under the site conditions, the Recreation and Parks Department may require remedial measures such as additional planting or replanting, weeding, additional fertilizer or other adjustments. The Developer will be responsible for the final application of pre and post emergents.

The policies and requirements described in this manual are minimum standards. Projects must meet or exceed these standards. If questions arise regarding a project that require clarification, please contact:

City of Santa Maria  
Recreation and Parks Department  
419 South McClelland Street  
Santa Maria, CA 93454  
(805) 925-0951, extension 260

## GENERAL INFORMATION FOR BOTH LANDSCAPE AND IRRIGATION

### 1. Landscape Standards

All landscaping and irrigation standards shall conform to Chapter 44 of Title 12 of the Santa Maria Municipal Code. (Landscape Standards)

### 2. Obstructions

The Contractor shall remove from the site all stones, debris, and other obstructions encountered unless specifically called for in landscape design.

### 3. Pre-construction meeting

There shall be no commencement of work until a pre-construction meeting is held.

Landscape Design Professional and Developer shall contact the Recreation and Parks Department at (805) 925-0951, extension 260 to set up the meeting.

### 4. Conformity with plans and allowable deviation

Finished work in all-cases shall conform to the lines, grades and dimensions shown on the plans. Deviation from the approved plans and working drawings may be required by the demands of construction. In all these cases, the changes must be prepared by the Design Professional and approved by the Recreation and Parks Department **and** authorized in writing.

### 5. Coordination of plans

Irrigation and landscape plans shall be coordinated to prevent interference between irrigation lines and plant materials. Trees shall not be planted over irrigation lines. In addition, irrigation and landscape plans shall be coordinated with grading plans and boundary wall plans. Landscape feature designs must not conflict with wall foundation elevations or approved public improvements. It is the responsibility of the owner to ensure that conflicts are resolved to meet City of Santa Maria Standards.

### 6. Schedule of work

The Contractor shall submit to the Recreation and Parks Department a written schedule of the work at least 5 days prior to the commencement of construction indicating the exact starting date.

## 7. Protection of existing facilities

Existing utility/irrigation lines, wires, water mains, etc. will be protected and maintained in service at all times. Should any existing facility be damaged it shall be promptly restored to its original condition. No existing facility may be taken out of service. The Contractor shall visit the sites and check location of existing utilities, conditions, verify dimensions and locations shown on the drawings.

## 8. Public convenience and public safety

Any work within the City right-of-way or easement area will require an encroachment permit. The Contractor's operation shall cause no unnecessary inconvenience and the travel rights of the public shall be maintained at all times.

Convenient access to structures, utilities, etc., along the line of the work, shall be maintained and kept in good condition.

In order to expedite the passage of traffic through or around the work, and where ordered by the Public Works / Engineering Department, the Contractor shall install signs, lights, flares, barricades and other facilities for the sole convenience, safety and direction of said traffic.

## 9. Contractor's responsibility

The Contractor shall perform and be responsible for the accurate layout of all portions of the work. The Contractor shall verify all dimensions and shall report to the Landscape Professional and the City's Recreation and Parks Department any discrepancies before proceeding with related work.

## 10. Final clean-up

The Contractor shall clean up the sites of the work, remove all rubbish, excess materials and equipment. All areas shall be left in a neat and presentable condition.

## 11. During the establishment period

Inspections will be regularly made. The inspections will include checking the plant material for health, possible disease and insect problems, weeds, gophers, missing plant material and proper maintenance practices. The irrigation system will also be checked. It is expected that any stressed or missing tree/plant material be replaced in a timely manner the Developer.

## 12. Final inspection

The final inspection shall be made after the final clean up is performed. The Contractor shall notify the Recreation and Parks Department at least 48 hours in advance to arrange the final inspection. The Recreation and Parks Department will, within 72 hours, make the necessary inspection, and if the work is found to be in compliance with the plans and specifications shall establish the beginning of the maintenance period. If corrections are necessary, 30-days will be allowed. It is the responsibility of the Developer to call to arrange for all follow-up inspections.

## LANDSCAPE - SPECIFIC RECOMMENDATIONS

Before submittal of landscape and irrigation plans, some or all of the following items are to be included on each plan or sheet, depending upon the specific project and the existing or proposed conditions at the project site. In order to conserve costs to the Developer and to expedite plan reviews, a pre-design meeting shall be held. This meeting will review all landscaping and irrigation requirements. Contact the Recreation and Parks Department at (805) 925-0951, extension 260.

Title Sheet: This sheet will always be numbered "T-1" and shall include the following:

- Vicinity map showing nearest arterial intersection, street names, north arrow and project location.
- Index of sheets.
- Title Block which includes:
  - a. Project title.
  - b. Developer's name, complete addresses and phone number.
  - c. Date plans were prepared.
  - d. Landscape architectural firm, complete address and phone number.
  - e. All other consultant's names, complete address and phone number.
  - f. Seal of Registered Landscape Architect, signed and dated, including expiration date of license.
  - g. Tract/parcel map number, planned development number and project address.
  - h. Revision block.
  - i. Sheet number \_\_\_\_\_ of \_\_\_\_\_.
  - j. Signature block for approval by the Director of Recreation and Parks Department.
- Graphics that indicate and identify:
  - a. Walls
  - b. Fences
  - c. Walkways
  - d. Pathways
  - e. Signs
  - f. Site furnishings
  - g. Structures
  - h. Recreational facilities
  - i. Parking lots
  - j. Site or landscape lighting
  - k. Concrete drainage swails
  - l. Underground drainage system
- Planting Plan: Shall include, but not be limited to the following:

- a. Location and spacing of all plants.
  - b. Plant material species with both common and botanical names, container size, quantity, minimum ground and aerial setbacks, and spacing requirements
  - c. Drawing orientation (traditional north arrow).
  - d. Drawing scale.
  - e. Standards for tree caliper, height and spread shall be specified.
  - f. Locations of all existing and proposed structures including street lights and fire hydrants.
  - g. Locations, size and species of any existing trees.
  - h. All existing easements and right-of-ways shall be indicated and labeled showing dimensions.
  - i. Size and locations of all existing and proposed private and public utilities within the right-of-way. (ROW)
  - j. Turf grass seed mix information including, but not limited to rate, mix, mulch, binder, fertilization and inoculation.
  - k. Planting details including street trees.
  - l. General planting notes.
  - m. Specifications.
  - n. Square footage of leaf surface or canopy at the time of planting.
  - o. Square footage of leaf surface or canopy at maturity.
  - p. Total square footage of the landscaped area to be maintained by a Landscape Maintenance District.
  - q. Percentage of decorative Redwood Fir bark to leaf surface or canopy at the time of planting.
- Irrigation Plan: Shall include, but not be limited to, the following:
  - a. Graphic presentation of all components of the system
  - b. A legend showing all symbols stating the manufacturer, precipitation rate, gallons per minute (gpm), radii of each head type and detail reference call out, as well as all pertinent dates for materials used in the system
  - c. Irrigation details
  - d. All systems shall have their equipment size, control valve size and station number given and gallon per minute stated. Pipe sizes shall be indicated numerically (i.e., ¾", 1". etc.)
  - e. Description and locations of the water service/meter shall include: domestic service; water meter size and address; installation requirements and responsibilities of the water purveyor and the Contractor; available static water pressure at point of connection (POC); design pressure; peak flow through water meter (GPM); total area served through the water meter in acres or square feet; yearly demand in acre/feet; irrigation program that documents the system as designed, provides sufficient supplemental irrigation based on the precipitation -rate of the specific head(s). The irrigation coverage of

the site can meet the highest demand monthly Eto within the following watering window:

Parks - 4 day, 8 hour window, 10 p.m. - 6 a.m.

Open Space/Easements - 4 day, 9 hour window, 9 p.m. - 6 a.m.

- f. Pressure loss calculations for each point of connection. Calculations shall show pressure loss for the system with the highest pressure requirement. -
  - g. Estimation of yearly water consumption
  - h. Description and location of the electrical service which shall include: point of connection to the electrical service, high voltage line to the electric meter, electric meter type, location and address and installation requirements and responsible parties.
  - i. Maximum gallon output per valve. Total gallon usage for system.
  - j. Station run time
  - k. Water window
    - 1. Booster pump, brand, size, type and locations (if required)
  - m. Locations of all existing and proposed surface improvements and structures.
  - n. Reference to City plan numbers for all existing and proposed improvements. Identify the location and depth of any utility line that may interfere with proposed construction. References shall include the type of improvements and responsible party for the improvement.
  - o. Locations of existing trees and requirements for performing work around them.
  - p. At park sites, wheelchair accessible exterior drinking fountains must be shown. Specify name, brand and model number. Contact the City of Santa Maria Recreation and Parks Department (805) 925-0951, extension 260 for model number. If no exterior drinking fountains are present in the design area, it must be specifically stated on the plans that none exist. The Developer is required to pay for all water connections/meters at the established rates.
  - q. General irrigation notes
  - r. Specification sheet
- All plans shall have the following notes:
    - a. Developer shall be responsible for providing a 2" conduit from the nearest available phone service to the location of the controller. Provide pull rope through conduit.
    - b. Provide and install all planting and irrigation in conformance with the City of Santa Maria Recreation and Parks Landscape and Irrigation Standards. In the event of conflict between notes or details on these documents, the standards shall take precedence. Obtain standards before bidding, (805) 925-0951, extension 260.
    - c. Prior to commencing work on the irrigation system, the following items shall have already been completed:



- All grading completed
  - Sidewalks, curbs and any on-site underground
  - Electrical supply for irrigation controller
  - Water meter paid for and set in place
  - Telephone conduit to controller location
  - Soils analysis completed for amendments and permeability
  - Pre-construction meeting held
- d. Contractor is to contact Toro at (800) 774-8873, extension 700 for complete equipment specifications and requirements when ordering Toro Network 8000.
- e. Prior to any planting, the following shall be completed to the satisfaction of the City of Santa Maria Recreation and Parks Department.
- Irrigation system shall be completely installed and fully operational. Department.
  - Soil amendments added as per results of soil analysis.
  - All trenches thoroughly compacted.
  - All grades to specifications.
  - Irrigation as-built plans submitted.
  - Controller chart in place at controller.

1. Wall Treatment:

A slumpstone or splitface masonry wall may- be required by the Community Development Department to be installed along residential properties adjacent to certain arterial and collector streets to separate the landscape and pedestrian access easement from interior private uses. Installation of shrubs and/or vining material and an approved system that permits and supports vine attachment to walls on ten-foot centers may also be required. If the footing exceeds six (6) inches, a notch out for plant material will be necessary. The notch shall be of sufficient size to accommodate a 1-gallon plant. All walls shall be constructed on private property and not within the easement or right-of-way area.

The Recreation and Parks Department may require a low retaining wall constructed adjacent to the existing wall to provide a planting pocket for vining material. The size of the retaining wall shall be dictated by the following factors: the existing wall, footing, slope and width of the planter. Both the Recreation and Parks Department and the Community Development Department shall have approval of this structure.

2. Sidewalk System:

The Community Development and/or Engineering Department may require a meandering sidewalk system or Multi-Purpose Trail II along the entire frontage of

certain arterial and collector streets. The sidewalk shall be constructed to City standards.

The sidewalk or trail should be formed in relation to the rolling landform resulting in slight undulations on both a horizontal, as well as a vertical plane in keeping with ADA compliance. Moving with and around the landform will produce a more pleasurable walking experience for the pedestrian.

Special consideration needs to be taken with the sidewalk or trail to maintain a minimum distance of 4 feet from the curb. This is done in order to avoid inadequate space for root growth and irrigation materials. The sidewalk may meet the curb only at an intersection or at a bus pull out. Colored stamped concrete may be used between the curb and sidewalk where widths are less than 20" and more than 8".

In those areas where the wall is indented, the opportunity should be taken to place the sidewalk or trail farther away from the curb/street. The finished grade between the wall and the sidewalk shall be shown on the landscape plans. This grade shall not be excessive. The Recreation and Parks Department must approve any grade greater than 5:1.

See the Meandering Sidewalk Detail page 50.

3. Earthworks:

The earthworks should be formed so as to create a rolling effect and should have a strong relationship with the meandering sidewalk or multi-purpose trail and informal planting layout. Mounding shall be provided at a maximum overall slope of 5:1 and shall not exceed 2 feet in height directly adjacent to the wall. Particular effort should be made, to avoid a "bump garden" appearance by blending the entire landform, together. In areas unable to conform to this requirement, a retaining wall may be integrated into the design.

The finished grade between the wall and sidewalk shall not exceed 5:1 without prior Recreation and Parks Department approval.

4. Recommended Plant List:

a. Layout

It is the City of Santa Maria's desire to have landscaping that is aesthetically pleasing, yet is not a high water consumer and has low maintenance requirements. Therefore, when designing landscaping for public easement areas, keep the ground cover and plant material to 50% of the total area square footage. Intermixing decorative Redwood Fir bark, cobble, colored

concrete and/or decomposed granite with the plant material to complete the remaining 50%.

See the Pit Sand/Decomposed Granite Detail page 51.  
See the Redwood Fir Bark Detail page 52.

The general planting concept for the street corridors is to create an informal setting that will provide an attractive view for pedestrians and motorists. In addition, it will provide a pleasing backdrop for adjacent properties.

In order to achieve the desired appearance, trees can be in massed group plantings of complimentary species. In addition, spacing of trees should vary from 8 to 12 feet apart. Please note that in turf areas, trees must be 15 to 20 feet apart. The use of variable plant sizes is also suggested in the following proportions:

<u>Size</u>	<u>Percentage</u>	<u>Caliper</u>	<u>Minimum Height</u>
15 gallon	60%	1 ½" to 2"	5'
24 " box	40%	2"	6'

Compatible shrubs can also be in massed plantings of the same or complimentary species with like maintenance requirements. The minimum container size for all shrubs is 5 gallon. Vining material container size is one gallon.

The earthworks, trees and shrubbery should be coordinated to accentuate the vertical and emphasize the changes in elevation.

b. Plant Groupings

To ensure the success and continuity of the overall planting scheme, it is necessary to group individual plants into plant compositions. These compositions must consist of trees, shrubs and ground covers that are compatible aesthetically, ecologically and with like maintenance requirements. In the interest of continuity, conformity to existing landscaping should be followed as close as possible. Plant selection for new development will be considered on a case by case basis.

Consideration should be taken to use allergy-free plant materials. The following shrubs are recommended:

- Abelia grandiflora\*①
- Arbutus unedo\*①
- Arctostaphylos densiflora\*①
- Callistemon citrinus\*④

Ceanothus\*②  
Cistus\*①  
Gazania (varieties shall be mixed - trailing)④  
Hakea\*①  
Juniperus chinensis "Armstrongii" (Armstrong Juniper)\*③  
Photinia\*①  
Pittosporum\*①  
Raphiolepis indica or ballerina (India Hawthorn)\*①  
Xylosma\*①

\* Denotes extremely drought tolerant plant material

- ① Allergy-free
- ② Allergy production moderate
- ③ Allergy production occasional to high
- ④ Allergy production not rated

## **Trees:**

This section shall cover the planting of trees along public streets, roads and highways, in the tree planting easements, and in other public areas.

Adherence to the following rules and regulations is required in order to obtain final approval and release of bond for the street tree planting.

Trees have been selected and designated to conform to the overall Approved Tree List. Substitutions are permitted only upon written authorization from the Recreation and Parks Department. Tree planting within public areas other than along streets, roads, highways and tree planting easements, shall be of the type specified by the Recreation and Parks Department.

Consideration should be taken to use allergy-free trees. All trees to be planted within the right-of-way of public streets, roads, or highways or within tree planting easements adjacent thereto shall meet the following minimum standards:

- a. Size: Shall be 15 gallon unless otherwise noted with a tapered caliper when planted.
- b. Height: Shall be measured from the top of the container soil level:

<u>Size</u>	<u>Caliper</u>	<u>Minimum Height</u>
15 gallon size:	1½" to 2"	5'
24" box size:	2"	6'

- c. Disease: There shall be no visible evidence of any disease or harmful insect. Any such evidence of disease or harmful insect shall require the removal of said specimen from the proposed planting-site.
- d. Root System: Any circling, kinking, constriction, or possible constriction by the root system that will have an adverse affect on the plants growth and is a direct result of cultural practices will not be accepted. The root system shall be free of sucker growth, cracks and abrasions.
- e. Quality: The nursery stock shall be first class and representative of the normal specie or variety equal to or exceeding standards of the California Association of Nurserymen and applicable Federal; State, or County codes and of the size specified. Only fresh, vigorous, healthy, well rooted, full, well branched, bushy, not leggy, and well established nursery stock shall be accepted.

The central leader shall be straight with no modification, unless otherwise indicated, and no broken branches. Plants that become wilted anytime before planting shall be rejected. If trees have been grafted, the callus formation must

be smooth and well healed. No trees shall have been pruned prior to delivery or at the time of planting, unless otherwise indicated. Trees that have been headed will be rejected:

- f. Inspection: Request for inspection shall be made 48 hours prior to planting. Prior to planting, all tree stock shall be inspected at the planting site by a representative of the Recreation and Parks Department. Only such stock that meets the minimum standards shall be planted. **Any stock planted without inspection and approval shall be deemed defective and shall be removed by the person or persons responsible for the planting at their expense.**

**1. Planting Procedures:**

- a. Location of Trees: An authorized representative of the Recreation and Parks Department shall mark all tree locations. In locating street trees, the following dimensions shall be observed and no trees shall be planted closer to existing installations than indicated:

***Location of the following to be verified by proper state and local authority.***

- |  |         |
|--|---------|
| • Water Meters   | 10 feet |
| • Sewer Laterals   | 10 feet |
| • Driveways and Alley Aprons                               | 10 feet |
| • Electrical Vaults  | 10 feet |
| • Street Corners from-the intersecting curb line projected | 40 feet |
| • Power and Telephone Poles                                | 10 feet |
| • Sidewalk Corners and Stop Signs                          | 35 feet |
| • Street Lights  | 10 feet |
| • Signal Light Intersections                               | 60 feet |
| • Fire Hydrants  | 10 feet |
| • Sidewalks and Curbs                                      | 4 feet  |

An authorized representative of the Recreation and Parks Department shall specify c

- Tree Well: Tree well setback from curb face shall be determined upon completion of curb and gutter construction.
- Other obstructions: Other possible conflicting structures shall be field checked at time of planting. Minimum clearance shall be as specified by the Recreation and Parks Director or an authorized representative.

- b. Preparation: All trees shall be planted in holes of adequate size and depth to allow the root system to grow and function naturally.

**The planting hole shall be at least four times the width of the root ball and equal to the depth of the root ball. Planting holes shall be cleared of all rocks, wood, and other debris and obstructions. Site shall be watered**

**or allowed to dry in order to provide the proper moisture for optimum planting conditions.**

c. Planting:

1. All containers shall be carefully removed prior to planting and the root ball shall be sliced vertically, one half inch deep every six inches unless otherwise indicated.
2. Fill hole with natural soil.
3. Apply a liquid nitrogen fertilizer in the surface well 2:10 per 100 square feet. Use extreme care not to get the fertilizer on the grass as it will burn.

**Trees shall be placed at the same elevations that existed in their containers.** Topsoil replaced shall be carefully compacted by hand tamping around the root ball. Stake tree at time of planting before backfilling. After planting, tree shall be thoroughly watered. Back-fill shall be at the same elevation as the adjoining soil, or one inch higher than the grade to allow for settling. If planted in an open parkway, a basin six inches deep and as wide as the planting hole shall be constructed around the tree to hold water.

d. Staking and Tying:

1. Staking: All stakes shall be free from knots, splits or cross grains. Stakes shall be of an approved type. All tree stakes will be inspected and approved by an authorized representative of the Recreation and Parks Department. Stake height requirements are a minimum. Certain trees may require larger stakes.

6' tree must have 8' stakes  
8' tree must have 10' stakes  
10' tree must have 12' stakes

2. Tying: Plastic, heavy-duty tree ties 1" wide shall be used in accordance with the attached.

e. Backfill and Fertilization of Planting Holes:

If the Recreation and Parks Department Director or an authorized representative determines that the planting soil is of poor quality and will not adequately support plant life, the soil shall be excavated and removed from the planting hole. The removed soil shall be disposed of by the person doing the work at his own expense. Backfill material shall be topsoil, with soil amendments specified by the Recreation and Parks Department.

f. Arbor Guards

Arbor guards or similar approved products shall be installed with any tree planted in turf areas. Watering basins shall be constructed on all trees.

g. Root Barriers

Root barriers may be required as dictated by the planting situation. Selection of barrier must have prior approval of the Recreation and Parks Department.

h. As-Builts

As-builts shall be supplied with the following information: species, diameter and canopy spread. Final locations shall be marked and correlated with an adjoining list. Any identifiable landmarks or hardscape shall be included to help identify the locations.

See the Tree Planting Specification Detail pages 53 & 54.



### APPROVED TREE LIST

<i><b>SPECIES</b></i>	<i><b>COMMON NAME</b></i>	<i><b>PLANTING AREA</b></i>
<i>Albizia julibrissin</i> ①	Mimosa	Small
<i>Archontophoenix cunninghamiana</i> , ①	King Palm	Small
<i>Arecastrum romanzoffianum</i> ①	Queen Palm	Small
<i>Cercis occidentalis</i> ①	Western Redbud	Small
<i>Lagerstroemia indica</i> "Zuni" or "Pecos" ①	Crepe Myrtle	Small
<i>Lyonothamnus floribundus</i> ⑤	Catalina Ironwood	Small (Good Drainage)
<i>Trachycarpus fortunei</i> ①	Windmill Palm	Small
<i>Laurus nobilis</i> ①	Sweet Bay	Small - Medium
<i>Magnolia soulangiana</i> ①	Saucer Magnolia	Small - Medium
<i>Pistachia chinensis</i> ①	Chinese Pistache	Small - Medium
<i>Pyrus calleryana</i> "Aristocrat" ①	Aristocrat Pear	Small - Medium
<i>Pyrus calleryana</i> "Red Spire" ①	Red Spire Pear	Small - Medium
<i>Pyrus kawakamii</i> ①	Evergreen Pear	Small – Medium
<i>Arbutus marina</i> ①	No Common Name	Medium
<i>Betula alba</i> ②	White Birch	Medium
<i>Geijera parviflora</i> ⑤	Australian Willow	Medium
<i>Ginkgo biloba</i> "Autumn Gold" ①	Ginkgo or Maidenhair	Medium
<i>Hymenosporum flavum</i> ⑤	Sweet Shade	Medium
<i>Jacaranda, acutifolia</i> ①	Jacaranda	Medium
<i>Koelreuteria paniculata</i> , ①	Goldenrain	Medium
<i>Rhus lancea</i> , ①	African Sumac	Medium
<i>Washingtonia robusta</i> ①	Mexican Fan Palm	Medium
<i>Tristania conferta</i> , ①	Brisbane Box	Medium – Large
<i>Koelreuteria bipinnata</i> , ①	Chinese Flame	Large
<i>Liriodendron tulipifera</i> ①	Tulip	Large
<i>Metasequoia glyptostroboides</i> ①	Dawn Redwood	Large
<i>Metrosideros excelsus</i> ①	New Zealand Christmas	Large
<i>Platanus orientalis</i> "Bloodgood" ④	London Plane	Large
<i>Quercus</i> ②	Oak	Large - Open Space
<i>Araucaria heterophylla</i> ⑤	Norfolk Island Pine	Open Space
<i>Calocedrus decurrens</i> ③	Incense Cedar	Open space
<i>Cedrus deodara</i> ⑤	Deodar Cedar	Open Space
<i>Cinnamomum. camphora</i> ①	Camphor	Open Space
<i>Magnolia grandiflora</i> ①	Southern Magnolia	Open Space
<i>Platanus racemosa</i> ④	Sycamore	Open Space
<i>Sequoia sempervirens</i> ①	Coast Redwood	Open Space

<i>*Planting Area</i>	<i>Definition</i>		<i>*Planting Area</i>	<i>Definition</i>
<i>Small</i>	Less than 5'		<i>Medium</i>	Between 5' and 10'
<i>Large</i>	More than 10'		<i>Open Space</i>	More than 12'

- ① Allergy-free
- ② Allergy production occasional to moderate
- ③ Allergy production moderate
- ④ Allergy production high
- ⑤ Allergy production not rated

No more than 15% of one species shall be planted. The Urban Forester must approve alternative species. A 24-hour notice is required to inspect plant material prior to planting, and for species, locations and final inspections. Installations shall be in accordance with Recreation and Parks Department specifications. **Species may change without notification.** If you have any further questions or need to schedule an inspection, call the Recreation & Parks Dept. at (805) 925-0951 extension 260.

## STORMWATER RETARDATION BASINS

All of the design recommendations previously discussed shall apply to stormwater retardation basins, along with the standards contained in Chapter 44 of Title 12. After fulfilling Public Works retention requirements and if the stormwater retention basin is also proposed for recreational use, a major portion of the basin should be at a higher elevation that would be inundated only under the most severe weather conditions and would be useable 48 hours after a rainfall.

A basin proposed for recreational use shall be designed in such a manner to accommodate organized and non-organized sport activities during non-rain periods. Improvements such as reduced slope ratios, irrigation, nuisance water diversion and parking could be provided. It is understood that these basins are subject to flooding up to 75% or more of their total area during typical rains. Inlets and outlets shall be designed to prevent entry by children and pets.

The slope ratio shall be a maximum of 4:1. Basins shall be designed to drain to a lower elevation that \* could remain inundated or "soggy" for longer periods of time following normal rain fall but would not interfere with the use of the area at the higher elevation terrace, In order to facilitate any trickle or casual nuisance water, a minimum 12" underground drain system connecting the water inlet and the base of all slopes leading to the outlet is required. If this is not possible, a surface concrete swail shall be required.

In a basin that the Developer is required to provide site improvements for recreational purposes, the permeability and the drainage of the basin must be guaranteed. All grades must be in accordance with the approved grading plans. The Developer is also required to submit a letter certifying all grades.

## CONCEPTUAL LANDSCAPE PLANS

A conceptual landscape plan shall be submitted to the Recreation and Parks Department for review of plant materials, landscape/hardscape placement, and ease of maintenance. If a conceptual landscape plan is submitted, it must clearly show plant species, quantity and location. Locations of all existing and proposed surface structures shall be shown.

After the conceptual plan is approved, the final plans shall be prepared by an appropriately licensed Landscape Professional in accordance with Chapter 44 of Title 12 of the Municipal Code. Four copies shall be submitted to the Public Works Department for distribution to the appropriate departments for final review and approval.

## STREET MEDIANS/ROUNDBABOUTS

The street medians and roundabouts are an important component of the overall landscape image for the City of Santa Maria and its citizens. While the roadways provide safe and efficient circulation through the City, the streetscapes weave the landscape fabric into the overall vehicular interface throughout the City. Gateways at key entries signify the entrances into Santa Maria and are important components for the City's circulation plan. It is the goal of the City of Santa Maria to provide for water conserving, functional and aesthetically pleasing landscaped medians and roundabouts throughout the City.

See the Street Median Detail, the Roundabout Detail and the Cobble Detail that are intended to illustrate the alternating landscaped areas and hardscape, on pages 55, 56 & 57. Planter areas may be configured in a curvilinear fashion or other dimension not shown.

### 1. Landscape/Hardscape Placement:

- a. The areas treated with cobblestone or stamped concrete shall include 50% of the total median/roundabout square footage. The remaining 50% shall be landscaped with plant material selected from the Plant Groupings listed previously. Water requirements for plants shall be consistent throughout the median.

- b. Landscaped pockets shall be added along the left turn lane pocket of the median. These areas to be landscaped shall be no smaller than 36 square. The first pocket shall be no closer than 40 feet from the intersection. No trees shall be planted in these pockets.
- c. It is required that cobblestone or stamped concrete areas not exceed 25 feet in length without a planter area provided except where median width is less than 36".
- d. Left turn lane pockets shall be planted according to the Street Median Detail on page 57.
- e. The top of the soil in the planter areas shall be 4" below the curb level. Soil shall be loose and friable to a minimum depth of 4 feet.
- f. Soil test and permeability test shall be the responsibility of the Developer. Both of these tests shall be conducted by a certified soil's lab with the report submitted to the Project Manager with a copy to the Recreation and Parks Department. The purpose of the soil test is to determine soil pH and fertility. Soil amendments (organic matter, fertilizers, etc.) shall be added as required by the tests to ensure a proper growing medium.
- g. Trees in medians shall be planted no closer than 3 feet from any concrete improvement. Trees planted in easement areas shall be no closer than 4 feet from any concrete improvement.
- h. In hardscape areas, pockets for trees shall be a minimum of 6 feet square.
- i. A complete irrigation plan shall be included with the landscape plan. Watering schedule and projected water requirements shall be included and identified in the irrigation plan.
- j. The irrigation system shall be water conservation oriented. The irrigation system shall be designed in accordance with the specifications of the Recreation and Parks Department and Chapter 44 of Title 12 of the Municipal Code.
- k. Depending on location and square footage, the irrigation system may need to be incorporated into the City's existing climate based irrigation network. Prior to beginning design, please contact the Recreation and Parks Department to determine if this is applicable.

2. Miscellaneous:

- a. The top of the soil in the planter areas shall be 4 " below the curb level. Soil shall be loose and friable to a minimum depth of 4 feet.
- b. Water, electric, and telephone to service the median strip shall be shown on the Public Improvement Plans and provided for prior to construction of the street improvements. Projects may be required to provide sufficient over-sizing of infrastructure to accommodate future growth.
- c. The color of the stamped concrete for primary and secondary arterial roadways through town shall be Brick Red of Davis Colors. The color shall be integrally mixed in the concrete as follows: 2 pounds of No. 160 per bag of Type I-II Portland Cement. The pattern of stamped concrete shall be equivalent to Lasting Impressions "Random Cobblestone." Other colors or forms of hardscape will be considered for outlying areas, subject to Recreation and Parks Department approval.

## TYPICAL DRAWINGS

The typical drawings attached as exhibits to these standards are intended to illustrate the basic concepts recommended for the design and treatment of walls, meandering sidewalks, earthworks, and landscaping. The Developer shall submit specific plans illustrating these concepts in detail for each individual development at the same time as public improvement drawings to the Community Development Department for final review and approval.

## TREE, SHRUB, VINE AND GROUNDCOVER PLANTING

Planting details of shrubs and vines shall be submitted. Vines shall be planted 10 feet on center and a system that provides for vine attachment to the wall will be specified. Ground cover shall not be planted within 24 " of shrubs and trees. In smaller mowed turf areas, trees shall not be planted closer than 8 feet on center and from block walls to allow for mower access. In open-turfed space areas, trees shall not be planted closer than 15 to 20 feet from block walls or stationary structures. Plant material shall be planted according to Chapter 44 of Title 12 of the Municipal Code.

See Shrub Planting on Slope Detail page 58.

## **IRRIGATION STANDARDS**

### **GENERAL:**

The City of Santa Maria is primarily serviced by state water and distributed by the City of Santa Maria's Water Division. The Recreation and Parks Department has the responsibility of reviewing the designs and plans for parks, open space and all public improvement areas and the associated irrigation installations. One of the primary considerations is to assure that these irrigation systems will be able to meet the time constraints placed on the operation of these systems within the prescribed "windows of operation" or quantity of water available during the course of the year.

Therefore, the design of irrigation systems for all of these areas is of extreme importance, for the efficient distribution of water to all landscaped areas and providing correct application of water to the subsurface depths for the specific plants being irrigated. The issue of preventing any surface runoff or waste of water in the process of operations of any and all systems is also a strict requirement.

The Recreation and Parks Department has developed irrigation design criteria and a list of irrigation components that have been deemed acceptable for use on parks, open space and public easement installations. The following design requirements address issues relative to the design and installation of irrigation systems.

### **IRRIGATION DESIGN:**

Any irrigation system that is in a park, open space or public easement area that is to be turned over to the City of Santa Maria must be designed and installed to meet the following requirements:

- a. Point of connection (POC):
  1. All projects shall be analyzed to determine the size of the water meter and pressure mainline relative to the scale of the irrigated area at the project site.
  2. The system must be able to apply the volume of water necessary to achieve the ETo for the highest demand month within the following criteria:

Parks:	8 hours per day, 4 days per week
Open space:	9 hours per day, 4 days per week
Public easement:	9 hours per day, 4 days per week
  3. The water meter and pressure mainline shall be sized to match the flow capacities of each (i.e., 2" meter and 3" mainline, 1½" meter and 2½" mainline).
  4. All systems shall be designed to operate at a water velocity not to exceed five (5) feet per second.
  5. A reduced pressure backflow preventer is mandatory per the Plumber's Unified Code requirements. The installation is to include an expanded panel stainless steel enclosure set on a concrete pad. Backflows shall be Febco brand. 1" - 2"

use Model 825Y or 825YA, 3" and up, use Model 880. Use optional valve setter Model 611, connect with ductile iron spools, lengths as required.

See Backflow Preventer Detail page 59.

6. A master valve shall be provided directly after the backflow preventer.
7. Each POC shall have only one irrigation controller. Maximum amount of stations per controller is 32 stations.
8. All POC's shall be located in planting areas, not lawn areas.
9. Gate valve(s) shall be provided wherever pressure mainlines branch off in different directions and on mainline runs of 250 feet maximum.

b. Controllers:

The City has the Toro 8000 Central Computerized System, which is linked via phone or radio to satellites. For this reason we require the installation of Toro 8000 satellites. These satellites are capable of operating multiple programs and up to 4 valves simultaneously. It is a 32 station controller. The Toro 8000 satellite #132-76-08 shall be used if the area to be irrigated is small enough for one satellite (32 stations) and no further phases of the same project will be proposed.

Toro 8000 satellites #132-56-08 shall be used in an area that will require the use of more than one satellite, either because of the amount of valves or the project is to be completed in phases that may require additional controllers.

With satellite model #132-56-08, a Radio-Phone Link Concentrator (PLC) model #100-76-18 is required for effective communication between Field Satellite and Central Irrigation Computer.

See Toro Installation Instructions Detail page 60.

PLC and satellites #132-56-08 shall be linked by a 1" conduit with pull boxes provided every 150 feet. In conduit, an armored shielded communication cable shall be provided by Contractor. Armored cable shall be such as that provided by Paige Electric Corporation model # P7162D-A1.

***Note - No splicing of communication cable shall be allowed other than in satellites where connections will be required.***

1. All irrigation controllers shall be installed in stainless steel enclosures on-concrete pads. Use VIT Stainless Steel Enclosure Model SB 24DSS.
2. Enclosures shall be installed at approved locations. Location to allow for observation of area serviced by controller.

3. Parks: Controllers to be located in maintenance building or approved location.  
Open Space: Controllers to be located at approved location, adjacent to P.O.C.  
Street Medians: Controllers to be located in parkway, adjacent to P.O.C.

C. Communication - Phone/Radio:

As previously stated, the City's central computerized system is capable of either phone or radio communication to field satellites. At satellites, either a phone modem kit or a radio link kit is to be installed. The choice shall be at the discretion of the City of Santa Maria Recreation and Parks Department. If radio communication is preferred, a 2" conduit from the nearest available phone service must be extended to field satellite #132-76-08 or Phone Link Concentrator #100-76-18. Contractor or Developer shall coordinate with phone company engineers as to their requirements and these conduits shall be on phone company prints for possible future use.

d. Phone:

When phone is the choice of the City of Santa Maria Recreation and Parks Department, plans shall also state that a 2" conduit shall extend from the nearest available phone service to a 10 x 10 x 6 rain tight electrical box. From box, extend a 3/4" conduit to either satellite or phone link concentrator. Also from box provide a 3/4" conduit for grounding wire #8-10 solid. Provide a 5/8 inch x 8 feet copper clad grounding rod.

Box shall be mounted on a 2" galvanized pipe 4 to 5 feet in length. Weld two 8" long 1½" channel struts to 2" pipe and connect box with bolts and spring nuts. Provide inside of box a square of ½" plywood for phone company equipment. All piping above ground from box shall be of galvanized steel. At base of box and around conduits, provide an 18" x 18" concrete slab for support. Provide phone cable through conduits. Box shall be placed within 10 feet of satellite or concentrator.

See Telephone Connection Detail page 61 and Phone Box Protection Detail page 62.

e. Radio:

When radio is the choice of the City of Santa Maria Recreation and Parks Department, prior to purchasing any satellite, radio equipment or choosing controller location, the following services and procedures must be provided by an authorized Toro representative. Contact Craig Zellers at (800) 774-8873.



1. An installation site survey.
2. Site location analyzed to determine the best radio frequency.
3. Selection of the required antenna type and height based on the distance and terrain between the central and satellite controllers.
4. The antenna cable type and length required for proper operation.
5. Specific antenna requirements to meet FCC regulations.
6. Required lightening protection.

***Note: If fees are required, all costs shall be the responsibility of the Developer.***

***Note: The City of Santa Maria Recreation and Parks Department will only accept a site once it is shown that either the phone or radio is completely operational and communication is achieved at central and that all manufacturers' installation procedures have been followed.***

#### Electric Valves:

Design shall not show grouping of more than 2 valves for any one specific area. Meaning that in a park, having all the valves in one area of the site. This will eliminate pipe stacking in trenches.

1. Each master valve shall be in a "jumbo" valve box.
2. Master valve shall be wired independently and have a separate station at the irrigation controller. The master valve shall be open only during periods when RCV's for the POC are programmed to be operating.
3. Master valve shall be located directly after the backflow preventer. Valve box to be located in a planning area.
4. The master valve can also function as a pressure reducing valve in conditions where the static PSI is greater than 75 PSI. Each remote control valve shall be installed in its own valve box.

See Electric Valve Detail page 63.

5. Remote control valves shall be Superior Valves Model #950 series. Use same brand for pressure regulating valves.
6. Remote control valves shall be located in planting areas only. Valve boxes shall be set parallel to each other and perpendicular to adjacent paving or concrete curb.

8. All remote control valves should be set and installed in planting areas where possible.
9. Each remote control valve shall operate an area(s) that is sequentially correct (i.e., top of slope-initially, mid slope-next, bottom of slope-last, higher elevations-initially, mid elevations - next, lower elevations-last).
10. Maximum valve size is 2". Maximum design flow through valve is 80 GPM.
11. Heads that irrigate ballfield areas shall be on separate valves than adjacent areas.
12. Each quick coupler valve shall be installed in its own valve box. Quick coupling valves shall be Rainbird Brand Ballfields and shall have 2 each -Model # 44LRC one by first base, the other by third base. All other areas use Model #33 DLRC.
13. Locate quick couplers at remote control valve manifolds, or at a maximum spacing of 150'o.c.
14. All quick couplers shall be double lug, 1" size units with a galvanized swivel.
15. All quick coupler valves shall be set and installed in planting areas or as directed.
16. All quick couplers should be isolated with own ball valves.
17. Minimum line size supplying a quick coupler is 1-1/2".
18. Each gate valve shall be installed in its own valve box. Gate valves to be used for line sizes of 2½" to 6".
19. Gate valve(s) shall be provided wherever the pressure mainline branches off in different directions and on mainline runs of 250' maximum.
20. All gate valves shall be full port design only.
21. All gate valves should be set and installed in planting areas where possible.
22. Each ball valve shall be installed in its own valve box. Ball valves to be used for line sizes 1" to 2".
23. Ball valves shall be used only on manifolded sub-mains or on lateral lines.
24. All ball valves shall be set and installed on level areas.
25. All ball valves should be set and installed in planting areas, where possible.
26. All ball valves shall be full port design only.

g. Irrigation Heads

1. Every irrigation head, regardless of change in elevation, shall have an integral or in-line check valve as a component of the head installation.

2. All turf heads shall be pop-up heads. Spray heads to be 4" or 6" depending on turf type and mow height. Stream rotors shall have a 4" minimum pop-up height.
3. All turf stream rotors shall have stainless steel risers.
4. All shrub heads at top and toe of slope shall be pop-up heads. Also any heads to be deemed in an "accessible area" or prone to vandalism, as determined by staff shall be pop-up heads.
5. All heads directly adjacent to any walk, curb, parking area, or pedestrian accessible area shall be a pop-up head.
6. Large turf heads shall be Toro or Hunter; Medium turf areas shall be Toro or Hunter; Small turf areas shall be Rainbird or Toro. All shrub heads shall be 12" pop-ups. Shrub Bubbler shall be Rainbird 1400 series Bubblers. Contact City prior to design.
7. All heads shall have a swing joint, composing from tee or 90 degrees, a Marlex street ell, schedule 80 nipple another Marlex, a threaded PVC 90, another schedule 80 nipple, then the head.

h. Trenching

1. No shared use of trenches will be allowed between various trades and for incompatible uses. Potable water lines for drinking fountains shall be in a designated trench. Electrical conduit shall be in a designated trench. Pressure mainline and lateral lines will only be allowed in the same trench when a minimum trench width of 18" is provided.
2. No pipes are to be installed directly over one another. A minimum of 6" horizontal shall be provided between parallel lateral lines to allow for accessing all pipes.
3. Sand bedding is required for all pressure mainline.
4. Detectable warning tape is required for all pressure mainline.

i. Piping

1. All pressure mainline for pipe 1½" or smaller shall be Sch. 40 PVC. All pressure mainline for pipe 2" - 3" shall be Cl. 315 PVC. All pressure mainline for pipe 4" - 6" shall be Cl. 315 PVC, AWWA rated, bell gasket type pipe, with Sch. 80 or cast iron fittings.
2. All lateral non-pressure pipe shall be Class 200 PVC.
3. All end runs, regardless of head type shall be ¾" line size minimum, 1" if the head inlet is 1".
4. Lateral lines on slopes are to be laid parallel to the slope contours.
5. No on-grade piping is allowed

Wiring

1. Spare wire shall be extended 1" each from the controller to the last valve in each direction of the mainline. It shall be looped in each valve

- box in the direction of the mainline. This spare wire shall be any color other than the wire color used for the valves at the site.
2. Sleeve shall be sufficient in size under all concrete and paved roadways. Wire sleeves across the roadway must have electrical sweeps at each end. The Developer shall provide a Carson box as a pull box.
  3. All control wires shall be color-coded. Submit a proposed color-coding schedule.
  4. No splices will be allowed on runs of less than 500'. On runs of greater than 500', splices are to be made with an approved splice unit, and to be installed in a concrete pull box. Identify on Irrigation Plans where splices and boxes are required.
  5. A booster pump will be required to be provided when the static PSI available at the POC does not provide sufficient pressure at the furthest head to effectively operate that station.
  6. The pump and all related equipment are to be installed in a protected enclosure on a concrete pad.
  7. Location and access to the equipment will be as determined by staff.
  8. Booster pump to be located directly after the backflow preventer and before the master valve.

k. Valve Boxes:

Shall be Carson 910-12 round in size or #1419-B-13 rectangular or equal. In playing areas, such as ball fields or soccer fields, valve boxes shall be Brooks #3 SP with Buckner Valve Marker #4274. Install with normal standards of bricks and pea gravel. Supply details of this with plans.

l. Sprinkler Heads:

Shall be as best suited for the area. The City's choices are for small turf areas to use Rainbird 1804 pop-ups, for medium size areas use Hunter PGH series. For medium size planter areas use Rainbird 1812 Hi Pops. For large planter areas, use Hunter PGH High Pops and for large turf areas use Hunter I-40-ADS-XX and I-40-36S-XX.

Low head drainage shall always be considered. Provide. Check Matic heads where required. In planter areas and vine pockets where only shrubs but no ground cover will be planted, use Rainbird 1400 series flood bubblers.

Areas having a group of shrubs shall be watered either by flood or stream bubblers. Bubblers shall be installed on a schedule 80 nipple-size as required with two 1/2" Marlex street ells then PVC fitting.

See Bubbler Head Detail page 64.

m. Quick Coupling Valves:

Shall be Rainbird #33DLRC in planter areas. Spacing shall be 1 every 150 feet along the mainline.

Ball fields shall have 2 in the turf area by first and third base. They shall be Rainbird 44LRC in a Carson valve box.

n. Swing Joints:

12 " pop-ups shall be installed with Rainbird funny pipe and barbed ells, and one Marlex street ell which would come off a barb ell and then into the sprinkler head.

See High Pop-Up Shrub Head Detail page 65.

All other heads shall have a typical swing joint, composing from the tee or 90 a Marlex street ell, a schedule 80 nipple, another Marlex, a threaded PVC 90, another nipple, then the sprinkler.

Swing joint for quick coupling valves shall be the same as the above mentioned except they are to be all galvanized fittings.

See Quick Coupling Valve Detail page 66.

o. Spare Wires:

Shall be extended 1" each from the controller to the last valve in each direction of the mainline. It shall be looped in each valve box in the direction of the mainline. This spare wire shall be any color other than the wire color used for the valves at the site.

p. Sleeves:

Shall be sufficient in size under all concrete and paved roadways. Wire sleeves across the roadway must have electrical sweeps at each end. The Developer shall provide a Carson box as a pull box.

q. Detail Sheet and Notes:

Must be provided prior to, approval with all plans showing all the above mentioned requirements.

r. Tests:

On plans, a note shall state that the following tests shall be performed in the presence of the City of Santa Maria Recreation and Parks Department Irrigation Specialist.

- a. Pressure test mainline for 1 hour at 150 P.S.I.
- b. At time of applying soil amendments.
- c. First coverage test prior to planting.
- d. Plant inspection.
- e. Final complete inspection.

Call (805) 925-0951, Extension 260. Please allow a 48 hour notice.

S. Stream Spray. Nozzles:

In the design, do not use stream spray nozzles on spray heads. These require high maintenance and do not do the job adequately.

It is the intent of the City of Santa Maria to provide the public with efficient systems that are easy and less costly to maintain.

In the design, consider the unnecessary overspray onto walks and roadways. For this reason, the City requires that any planter area smaller than 3 feet in size should be hardscaped.

The watering time window is another thing to consider in design. Normal is considered to be between the late evening hours until 6 a.m. The Toro Network 8000 controllers are capable of multiple programs simultaneously. With this in mind, and in designs where the total amount of valves are numerous, the watering will overlap into the morning hours. We require that the meter and main be sufficient in size to operate more than 1 valve at one time, thus reducing watering time by half.

The system shall be designed as to allow the proper weekly watering to be completed in 4 watering days, which is the common City practice. With new irrigation material constantly coming onto market, we would be happy to discuss the possibility of a new item that may be better suited for a particular

situation. Please feel free to contact us with this or any questions you may have.

## **IRRIGATION - SPECIFICS**

a. Water Meters:

Fees for setting water meters shall be in accordance with the City Ordinance and paid for by the Developer. If the subdivision or median is to join a Landscape Maintenance District, the subdivider shall pay for the water until such time that the area has passed final inspection and has been accepted into a district.

b. Point of Connection:

Make connections of irrigation system mainline to water meter in approximate location shown. See plans for details.

c. Electrical Meters:

New electrical meters required by this contract shall be provided under the Electrical Section.

d. Drawings:

Grading plans shall be submitted, along with detailed landscape and irrigation plans, to the Community Development Department. Installations shall be according to approved plans.

The drawings are diagrammatic only. It is the intent of the plans and specifications that the irrigation system shall efficiently and uniformly irrigate all areas according to horticultural and soil requirements, and that it shall be complete in every respect and shall be ready for operation to the satisfaction of the City of Santa Maria Recreation and Parks Department.

Contractor shall notify the Landscape Architect and then the City of Santa Maria Irrigation Specialist before starting any work if dimensions differ from the contract drawings.

1. **Materials List and Manufacturer's Catalogs**

Within 35 days after award of contract, submit 4 copies of a complete materials list, including manufacturer's name and number covering all material required, together with 4 copies of descriptive literature.

## 2. Controller Charts

On the inside surface of the cover of each automatic controller, the Contractor shall provide and mount a copy of "as built" plans, reduced as necessary and legible in all details. Copy shall be made to a size that will fit into controller cover but not to exceed 9 1/2" x 15" in size. This copy shall show valve number sequence and each valve and lateral piping shall be highlighted in a different color. This print shall be approved by the City Irrigation Specialist prior to being hermetically sealed in plastic.

### e. Miscellaneous Items to be Furnished by Contractor:

Provide the following tools as a part of this contract:

1. 2 operating keys suitable to operate each type of valve used.
2. 2 quick coupler valve keys to fit the type of couplers used (complete with hose bib).
3. 2 quick coupler lock type cover keys; 1 set of automatic controller cabinet keys for each controller used; spare wires leading to each direction of flow from the controller.

### f. Guarantee:

A letter of guarantee from each manufacturer shall be submitted to the City of Santa Maria Recreation and Parks Department guaranteeing materials for a period of 1 year against material defects and workmanship. In cases where longer guarantees are required by these specifications, such guarantees shall be submitted.

## **MATERIALS**

### a. Specifying by Name:

Whenever any material is specified by name and number thereof, such specifications shall be deemed to be used for the purpose of facilitating a description of the materials and established quality, and shall be deemed and construed to be followed by the words "or approved equal." No substitution will be permitted which has not been submitted for approval to the City within 30 days after the contract has been awarded. 3 copies of descriptive literature, including pressure loss curves, nozzle performance characteristics, etc., shall be furnished for any materials submitted as "equal" substitutes.

No item will be considered as "equal" if it is constructed of different materials or alloy or is of a different principle of operation. At no time shall the design exceed



80% of the manufacturer's specifics. Design shall factor in for a 10 mph wind. Piping, tubing, conduit, valve, or any device through which the flow of water must pass shall not cause a greater resistance, turbulence, or pressure loss due to friction than that material as engineered and designed into this system.

Pressure loss curves shall be certified by an impartial commercial testing laboratory with all costs for tests and reports being paid for by the Contractor wishing to make the substitution.

Contractor shall submit letter and material list with Design Professional's stamped approval stating his reasons for any substitution and showing amount of credit offered if substitution should be acceptable.

b. General:

All materials shall be new and of the size and type as called out on the drawings. All materials of like kind shall be by one manufacturer.

c. Shut-off Valves:

1/2" through 2" shall be 200 lb. WOG bronze gate valves, non-rising stem, hand wheel, Teflon impregnated packing gland, solid wedge disc. 2-1/2" and over (below grade installations) to be 200 lb. WOG butterfly valves with resilient lined seats of wafer-span type, replaceable body O-ring flange seals, bodies of high strength cast iron with aluminum bronze disc, 316 stainless steel shafts, Buna-N seats and seals. Buried valves equipped with AWWA 2" operating nuts to be operated with T-handle extension wrench.

See Gate Valve Detail page 67.

d. Valve Boxes for Main Shut-Off Valves:

Size and type as called out on the drawings.

e. Backflow Preventer:

Backflow preventer shall be of size and type as called out on the drawings, complete with gate valves and test cocks provided by the manufacturer of the device.

f. Galvanized Steel:

Shall be steel pipe, Schedule 40, standard weight, ASTM A120-81, hot dipped galvanized, 21 foot lengths, threaded, coupled at one end.

g. Fittings Steel:

150 lb. galvanized malleable iron, banded.

h. Unions - Steel:

Galvanized steel with brass to iron seat, minimum 300 lb. WOG, ground joint.

i. Risers Ferrous Metal:

Shall be galvanized steel pipe to strainer assembly. Material for sprinkler head risers shall be as called out on the drawings.

j. Pipe Wrap:

Galvanized steel pipe to strainer assemblies shall be field wrapped as detailed or to 6" above finished grade. Use 10 mil PVC tape, 2 layers (half lapped) to equal 40 mil thick total wrapping. Clean surfaces and prime with solution required by manufacturer of tape. Field wrap all joints with same materials leaving identification marks visible, re-apply wrap over holidays as recommended by tape manufacturer. All wrapping to be tested in the presence of the City representative using approved type holiday detector.

k. PVC Pipe (General):

All pipe to be permanently and continuously marked with manufacturer's name, pipe size (IPS) and schedule (D-1785-68 for schedule pipe), SDR number for class pipe (ASTM D-2241-80), manufacturer's lot number and NSF approval. Pipe with dents, ripples, wrinkles, die or heat marks is not acceptable. Pipe shall be delivered to the site in 20 foot lengths.

l. Threaded PVC Nipples:

Schedule 80, Type 1, 3" minimum length, except where detailed otherwise on drawings. Nipples to have machine threads, not pre-molded, E.A. Gray Co., or approved equal. PVC domestic main to drinking fountains shall be PVC Schedule 80 solvent welded plastic pipe; gray in color, meeting ASTM D 1785 "B."

m. PVC Mainline:

Shall be 1120/1220 normal impact, 1/2" through 1 1/2" use Schedule 40, solvent weld-type. 2" through 4", use Class 315 solvent weld plastic pipe. 6" and over, use Class 200, ring type, integrally thickened bell ends, rubber ring seals or gasket coupling joints.

n. PVC Laterals (Non Pressure Piping):

Normal impact, Class 200, solvent weld-type meeting ASTM D-2241.

o. Fittings:

For make-up, shall be of same chemical compound as pipe on which it is installed. Use Schedule 40 medium-wall fittings for any "all socket" connections. Use Schedule 40 heavy-wall fittings for all fittings with one or more threaded outlets. Fittings for ring-type connections shall be compatible with the pipe on which they are used. Sealing rings shall be procured from the manufacturer of the pipe and meet configuration of grooves and diameters provided. Fittings 6" and over in size shall be Lockwood Ames epoxy coated steel fittings, 175 P.S.I. w.p.

p. Pipe Compound:

Threaded connections, including PVC to steel make-up, shall be best grade Teflon tape.

q. Primer:

For PVC solvent weld, connections shall be as recommended by the manufacturer of the PVC pipe. Primer shall be chemically compatible with the pipe, fittings and solvent. No primer needs to be used if "Christy's Red Hot Blue Glue" is used as solvent material.

r. Solvent:

For PVC solvent weld, connections shall be as recommended by the manufacturer of the PVC pipe. Solvent shall be chemically compatible with the pipe, fittings and primer.

s. Sprinkler Risers:

The riser shall be PVC Schedule 80 to fit sprinkler opening in swing joint assembly and proper length as detailed on the drawings.

t. Quick Coupler Valves:

150 lb. cast bronze body, self-closing metal cover with rubber protective caps, locking-type. Threaded track, 1" size.

u. Couplers:

Same manufacturer as quick coupling valve; cast bronze, machined shank, coupler to include operating handle. Top of coupler equipped with 3/4" hose bib.

v. Sprinkler Heads:

Make, size, type and performances as called out on the drawings.

w. Automatic Controller:

120 volt, 5 amp, single phase, 60 cycle electric clock control unit in weatherproof, vandal-resistant metal cabinet, hinged locking door. Shall incorporate the following features: 32 stations, 0-4 hour timing, 1 minute increment, satellite-type controller with 8 possible programs and up to 3 repeat cycles. Shall have water budget feature on all stations 1 to 900%. No delay between stations. To operate 24 volt valves. All control devices to be captive-type. Contains pump-starting-stopping circuit. Master switch cuts all power circuits except starting clock. Controller shall be as called out on the drawings.

x. Remote Control Valves:

Should be as called on plans.

y. Valve Boxes for Remote Control Valves:

Size and type as called out on the drawings.

z. Electrical Requirements to Automatic Controllers - (120 v):

To be complete in every respect to Electrical Code, ready for use and in accordance with manufacturer's requirements. Provide separate power shut-off switch at panel for each controller. All wiring in galvanized conduit and fittings from source provided under the electrical section. No running threads accepted; use nipples. Conduit system shall be 660-volt insulation, NEC standard annealed copper wire and shall be minimum AWG #12 TW or RW. Protect each controller by a code approved ground connection. Supply to be 120 volts, 60 cycle, single phase, 1 amp. Use only galvanized steel fasteners in securing controllers in position. Install new controller as detailed on drawings.

aa. Electrical Requirements for Automatic Controllers - (24v):

To remote control valves shall be U.F. type, UL approved, AWG number 14 solid strand copper wire with minimum 4/64" PVC coating, 600 volt, 75 C. "Common" wire to be white coated. Each "pilot" wire to be a different color.

bb. Flow Sensor:

Each field satellite shall include one sensor input board for the purpose of monitoring flow, rain and/or other status inputs. This board is called a Sensor Input Board and can be used to monitor flows downstream of a pump, well and/or flows within irrigation mainline. The purpose of this board is to provide sensor input back to the central via the communication path for any of the following inputs:

1. 2 Flow sensors (2 per board)
2. 1 Rain gauge
3. 3 Status points (dry contact), lights, security systems, fountains, etc.

Toro offers two model numbers for this board, one for each type of field satellite pedestal. The City of Santa Maria utilizes both styles of field satellite pedestals that require the following model numbers:

Description	Model Number
SIB for stainless steel pedestal	995-63
SIB for green satellite pedestal	995-60

Field wiring from sensor inputs are to be connected directly to the sensor input board per the enclosed technical booklet provided by Toro. Wire sizing from an input will vary based on the length of wire run, allowable voltage loss and input being utilized. It is recommended that this wire be enclosed within a PVC conduit from the sensor input to the field satellite. Recommended minimum size for the conduit should be 1". This board shall be specified as installed by the authorized Toro distributor or by the Toro factory as part of the written specifications.

When using the sensor input board with flow sensors, Toro requires utilizing one of the following Data Industrial Flow Sensors:

<u>Model Number</u>	<u>Pipe Sizes (Inches)</u>
220P	1 -5
228B	2 -21/2
250B	1 - 11/2
Sch 10S	3 -6

Sch 10	14	-18
Sch 20	8	-18
Sch 40	3	-6
Sch 30	8	-18
Sch 40S	12	-18

<u>Model Number</u>	<u>Pipe Sizes (Inches)</u>	
Sch 60	8	-18
Sch 80	3	-18
Ex Strong	12	-18

This manufacturer of flow sensors can be "read" by the Network 8000 software without any additional interface units. Flow meters should be sized to read all flows.

In applications where the flow differential varies greatly, a bypass piping manifold of a smaller pipe diameter with a second smaller flow meter may be necessary. This is to allow the flow meter to read a "full" pipe.

The Network 8000 central software can be programmed to monitor flows based on pipe sizes and flows per the enclosed chart. (Toro part # 366-0027, Calibration Chart Network 8000 Central Flow Sensor.)

### **TORO CALIBRATION CHART NETWORK 8000 CENTRAL FLOW SENSOR**

How to use the Industrial Flow Sensor Calibration Chart with the Network 8000 Control System.

1. Install the Flow Sensor in accordance with Data, Industrial's instructions for Model #220.
2. The Network 8000 Control System must utilize one or more of the following (options) to interface with the Data Industrial Flow Sensor (#220).

\*995-60 Sensor Input PCB Assembly Kit for Green Pedestal

\*995-63 Sensor Input PCB Assembly Kit for Stainless Steel Pedestal

\*132-76-18 Monitor Control Unit

3. Attach flow sensor to one of the above options per installation instructions for each unit. Select the pipe size in the chart that most nearly represents the inside diameter (I.D.) of the actual pipe where the flow meter is or is to be installed. Should the size be unknown, just measure the I.D. for comparison with the chart.
4. Enter the M (f) and B (f) numbers from the chart (that represents the determined pipe size) on the "Monitor Control" screen of the Network 8000 Central. Select

factors column "ON" and enter these numbers in the appropriate "Factors" columns by light pen/mouse and keyboard.

PIPE MODEL #	NOMINAL SIZE	I.D.	M(f) K -VALUE	OFFSET	B(f)	FLOW	
						PIPE MIN.	SENS. MIN.
220P-1	1	0.96	0.225	0.397	0.089325	2	5
220P-1.5	1.5	105	1.848	0.277	0.419496	8	40
220P-2	2	1.94	2.725	0.392	1.0682	13	50
220P-3	4	4.02	8.309	0.277	1.886143	35	160
220P-4	5	5.15	15.35	0.248	3.8068	65	300
228B-2	2	1.99	2.747	0.386	1.060342	10	50
228B-2.5	2.5	2.52	3.741	0.386	1.444026	16	75
228C-2 15	2	2.07	2.809	0.276	0.775284	12	50
228C-2.5	2.5	2.51	3.74	0.277	1.03598	16	75
228S-2	2	2.07	2.809	0.276	0.775284	12	50
228SS-2.5	2.5	2.51	3.74	0.277	1.03598	16	75
228C-2-40	2	2.1	2.604	0.25	0.651	12	50
250B-1	1	1.05	0.41447	0.44117	0.182852	2	8
250B-1.25	1.25	1.38	0.76447	0.16489	0.126053	3	15
250B-1.5'	1.5	1.61	1.06526	0.0892	0.095021	4	20
SCH 10S	3	3.26	5.009	0.09	0.45081	26	130
SCH 40	3	3.068	4.362	0.063	0.274806	23	115
SCH 80	3	2.9	3.858	0.043	0.165894	20	100
SCH 10S	4	4.26	9.597	0.241	2.312877	45	220
SCH 40	4	4.026	8.34	0.229	1.90986	40	200
SCH 80	4	3.826	7.354	0.188	1.382552	36	180
SCH 10S	5	5.295	16.305	0.25	4.07625	69	340
SCH 40	5	5.047	14.674	0.248	3.639152	62	310
SCH 80	5	4.813	13.165	0.246	3.23859	57	280
SCH 10S	6	6.357	24.089	0.26	6.26314	100	495
SCH 40	6	6.065	21.574	0.257	5.544518	90	450
SCH 80	6	5.761	19.457	0.254	4.942078	81	406

cc. Field Satellites:

Each field satellite shall be installed with an optional "Sensor Input Board", Toro model # 995, as the interface between the central software and field sensor inputs as specified. These components shall be pre-installed by the factory or authorized Toro distributor prior to delivery of the field satellite.

Field wires from sensor inputs shall be connected to either board based on its application and function. Field wire shall be UF direct burial wire a minimum of 16 gauge unless otherwise noted.

dd. Flow Meters:

Flow meters shall be Data Industrial of the model and size per the irrigation legend. Flow meters shall be installed in plastic or concrete valve boxes of a size large enough to allow for periodic access and maintenance to equipment. The Contractor shall provide valve box extensions when applicable.

All field wire input connections from the flow sensor to field wire back to the SIB board shall be made with 3M "DBY" connectors only. Field wiring between the flow meter and field satellite shall be continual without any splices. Field wiring shall also be placed within schedule 40 grey electrical conduit of a burial depth approved by the City. The Contractor shall provide plastic or concrete pull boxed every 250 feet with lockable covers. Field wires shall have a 6 foot expansion loop within each pullbox. The location and direction of the field wire conduit shall be indicated on "as-builts" turned over to the City prior to the final walk-through.

ee. Wire Connectors for Direct Burial Conductors (24 v):

600 volt 60 C, AWG-UF type, waterproof, epoxy or PVC compound filled containers.

ff. Di - Electric Isolation:

Provide between all connections joining ferrous and non-ferrous metals, or old (existing) ferrous and new ferrous metals. Submit for approval type intended for use.

gg. Concrete:

2,000 lb. strength at 28 days. Fine aggregate may be granular sand. All rock and gravel for use in concrete shall be mechanically washed and free from injurious amounts of deleterious substances.

## **INSTALLATION**

a. General:

All work shall be performed by competent, experienced workmen and in a manner to coincide with methods as set forth by the manufacturers of the equipment to be used. The Landscape Professional has the responsibility to guarantee that it is



installed according to the approved plan. No consideration will be given to any design changes unless called for by the Landscape Professional.

Contractor shall be responsible for damages caused during his operations to any existing underground utility lines including existing irrigation control wires, storm sewers, sanitary sewer systems, gas lines, potable water lines, irrigation lines, telephone cables, gasoline or oil lines, electrical cables, or any other systems (buried or overhead). If such damage should occur, Contractor shall immediately notify Landscape Professional, City of Santa Maria, and any other department affected by the damages and shall pay all ensuing costs.

Contractor shall comply with all governing construction and plumbing ordinance<sup>5</sup> for all work under this contract.

All work shall be assembled to conform to details and notes on the drawings, whether or not mentioned in the specifications.

b. Verification of Dimensions:

Verify all horizontal and vertical site dimensions prior to staking of heads. Do not exceed spacing shown on drawing for any given area. If such modified spacing demands additional or less materials than shown, on the drawings, notify the Landscape Professional before commencing work.

c. Manufacturer's Requirements:

Manufacturer's requirements for installation of products shall apply:

- a. When no other direction is given.
- b. When it is a more stringent requirement than the "Standard Specifications" and these "Special Provisions."

d. Work Space:

The Contractor shall erect fences or guards as are required for the protection of the public and protection of construction materials, and maintain same in good repair until the completion of the work under the contract.

e. Drawings of Record:

Obtain blue-line ozalid prints from the Landscape Professional and maintain daily records showing every change from the contract drawings of all locations of mainlines, buried valves, conductors, quick coupler valves, and plugged or capped outlets. Locate each item from 2 points of architectural permanence (i.e., curbs,

walls, light standards, etc). Do not take dimension from sprinkler heads or other parts of the irrigation system. Keep record drawings on site for daily observation by the City Irrigation Specialist. All dimensions to be taken prior to backfill. On date of final observation, deliver corrected drawings to the City Irrigation Specialist. Final drawings shall be prepared by the Contractor on sepia prints, showing all field notes in India ink finalized by a competent draftsman. Delivery of prints does not relieve the Contractor of responsibility for providing any information that may be omitted from the prints.

f. Trenching:

Do all excavation for installation of all work included in the contract. Mechanical trenching machines shall be the type to cut trenches with straight, parallel sides. Trenches to be only wide enough as may be required to lay the pipe and control wires. "Pulling" of mainline pipe and/or control wires will not be permitted. Contractor shall use all possible care to protect existing trees and plants during trenching. Roots 2" or larger shall be tunneled under and wrapped with wet burlap to prevent scarring with 2 coats of approved sealer manufactured for this purpose. Cover all trenches in root areas (only while open) with wet burlap, and backfill within 24 hours after opening the trench. Obtain the City Urban Forester's approval before cutting any root over 1" diameter by calling (805) 925-0951, extension 260. All trenching in such areas shall be done by hand.

See Trenching Detail page 68.

g. Backfill:

After the work has been installed to depths as detailed on the drawings, flushed, tested and proven tight in the presence of the City's Irrigation Specialist, backfill with fine materials. Allow no rocks or other objects larger than 1" diameter to fall in the first 6" of cover. Backfill carefully and tamp properly to avoid any voids. Flooding of trenches shall be done only with the approval of the City's Irrigation Specialist; however, all sandy soils shall be flooded during the backfill/compaction operation.

After compacting backfill over all pipelines to equal density of adjoining undisturbed soils, Contractor shall remove all remaining debris caused by his operation from the site and dispose of it in a legal manner. (See note below.) All trenches shall be left flush to the adjoining undisturbed grades. Any work covered prior to field observations by the City's Irrigation Specialist shall be uncovered at the expense of the Contractor to allow for such observations.

Note: In the event that after backfilling and compaction operations are completed, there is a deficit of material, the Contractors are to import sufficient material to achieve a level surface with adjacent grades. Material shall have the City of Santa Maria Recreation and Parks Department approval prior to import. Any trench

subsidence during the maintenance period shall also be filled with approved import by the Contractor. All costs involved with the aforementioned work shall be included in the contract lump sum bid.

h. Laying of Lines:

Lines shall be staked and installed in the locations shown on the drawings. Discrepancies between drawings and site shall be brought to the attention of the City's Recreation and Parks Department prior to trenching. Do not exceed maximum spacing shown on the drawings. Do not exceed the GPM on the pipe sizes shown. Assemble all pipes free from dirt and scale; ream and deburr. Piping and electrical sleeves under concrete shall be set in place prior to paving work. If pipe must be laid after paving is in place, it shall be done by jacking, boring or hydraulic driving.

If cutting or breaking of any paving is necessary, it shall be done and replaced with like material at the expense of the Contractor. Obtain approval of the City's Public Works Department prior to any cutting or breaking. Hydraulic driving will not be permitted under asphalt paving. All sleeves set in place under paving shall extend 18" minimum beyond such paving and be capped hand tight. No fittings, including couplings, will be permitted under surfaces to be paved except where the length of the line under the paving exceeds 20 feet or where lines are encased in sleeves.

i. Assembly of Metal Pipe:

Do not bend or spring pipe; make all offsets or changes in direction with fittings. Cut threads with sharp, clean dies to conform to ASA specifications B2. Make up joints by applying oil-based compound to make threads only. Remove excessive compound after makeup.

j. Assembly of PVC Pipe:

Handle with care when loading, unloading, transporting and storing to avoid damage. Store pipe and fittings under cover before using. Transport in vehicle with bed of sufficient length to carry pipe flat and fully supported. Store pipe in same manner. Notify the City's Irrigation Specialist for observation when each pipe and fittings shipment reaches the site. Rejected materials shall be immediately removed from the site and replaced with a new shipment of a different batch number.

k. Joining by Ring Seals:

Provide for expansion and contraction at each end. Use rubber ring and lubricate with non-toxic lubricant. Center-load, leaving all connections exposed. Do not lay pipe in trench containing water or at less than 32 degrees F.

l. Thrust Blocks:

Concrete thrust blocks shall be provided with ring-type PVC pipe at all points where line changes direction, or thrust, as at elbows, tees, reducers, dead-ends, or where the line changes direction greater than 10 degrees. Pour blocks to leave valves and fittings accessible for repair. Thrust blocks to be of size and shape as prescribed in pipe manufacturer's installation manual, which shall be a part of this specification, by reference.

m. Joining by Solvent Weld:

Use a non-synthetic brush to spread primer and solvent using correct sized daubers as recommended by pipe manufacturer. Clean and refill cans each day. Cut pipe square, ream, chamfer outside end. Clean and dry pipe and fitting socket. PVC solvent weld connections shall be made as recommended by the manufacturer of the PVC pipe. Bottom the pipe in socket and turn 90 degrees. Hold joint together 30 seconds. Wipe off excess solvent. Allow to set 30 minutes before moving. Snake pipe side to side in trench bottom, keeping a 4" horizontal clearance between 2 pipes in the same trench. Do not lay pipe in trench containing water or at less than 32 degrees F. Center load immediately leaving joints exposed.

n. Flushing of Lines:

Mains shall be flushed before attaching remote control valves, quick coupler valves and with pipe centerloaded. All water being discharged shall be temporarily piped up and out of the trenches. Trenches are to be kept dry for pressure test to follow. Install all valves after approval of flushing procedure by the City's Irrigation Specialist.

Laterals shall be flushed before sprinkler heads are in place. Cap all risers, apply pressure, remove caps in sequence starting at the control valve. Replace caps before removing caps to follow. Continue to the end of each lateral. Flush until all foreign matter and mud is cleared out of the system. Contractor is to provide all materials required for flushing operations.

o. Pressure Tests:

Perform all hydrostatic tests in the presence of the City's Irrigation Specialist after flushing lines. Maintain 150 PSI on mainlines for 1 hour with all air expelled from line and with all valves in place. All leaks shall be corrected in a mechanical manner without use of epoxy fillers or other filler compounds. Provide all equipment for tests including force pump and pressure gauges.

p. Laying of Control Wires (24 volt):

Lay wires in common trench with mainlines. Splicing allowed only every 500 feet. Provide 2 feet expansion loop at splice. Use concrete electrical junction box with bolt down lid at each splice point. White coated common wire in junction boxes to be tagged with ¼" wide embossed plastic labeling tape showing controller designation. Use plastic electrical tape and bind all control wires in bundles at 10 foot intervals. Splices, including splices at remote control valves, shall be waterproof. Install PVC sleeve where wire is not installed with mainlines.

q. Protection during Hydromulching:

If seeding of any portion of the site is to be done by hydromulching methods, Contractor shall protect all sprinkler heads in the areas to be hydromulched by slipping plastic bags of appropriate size over each head prior to the hydromulching operation. All bags shall be removed after cessation of hydromulching and disposed of properly.

r. Adjusting System:

Adjust entire system prior to coverage test and again at conclusion of maintenance period.

1. Set all shut-off valves in the system to full open position.
2. Adjust all stationary heads to equal and uniform coverage using adjusting screws in each sprinkler head and by control of the throttle device in each remote control valve.

s. Observations:

Observations will be performed by the City at the following times and at random visits when the observer may be on the site:

1. Pre-work conference. To be conducted prior to any irrigation work under this contract. A job time-line will be established at this time.
2. Observation of flushing.
3. Observation of pressure test.
4. Observation of coverage performance.
5. Final observations of the completed installation.

6. Contractor shall not cover any work prior to observation by the City.
7. All observances called for by the Contractor shall be requested in writing, at least 48 hours prior to the anticipated observation. This includes inspection of plant material.
- 8: Work will not be performed on weekends.

t. Maintenance:

The irrigation system in its entirety, including all work done under this contract, shall be under a 1 year warranty from the date of acceptance of this project against all defects and faults of material and workmanship.

The Contractor shall adjust all irrigation heads so that all turf or shrub areas are properly covered as intended by the irrigation plan and the irrigation heads shall be adjusted so as to prevent excessive overspray onto areas not intended to be watered. These adjustments are to be made to the satisfaction of the City's Irrigation Specialist prior to acceptance of the job and refined as necessary during the maintenance period.

## GLOSSARY

For the purpose of this manual, the following terms shall be defined:

***anti drain valve or check valve:*** a valve located under a sprinkler head to hold water in the system so it minimizes drainage from the lower elevation sprinkler heads.

***application rate:*** the depth of water applies to a given area, usually measured in inches per hour.

***applicant:*** any person or business, requiring a construction permit per City code requirements. This person or business shall apply for and receive any and all permits from the Community Development Department and/or the Engineering Department.

***automatic controller:*** a mechanical or solid state time, capable of operating valve stations to set the days and length of time of a water application.

***backflow prevention device:*** a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

***C.I.M.I.S.:*** the California Irrigation Management Information System. This is a system administered by the California Department of Water Resources, which maintains weather stations throughout the state, which records the daily ET numbers.

***drought tolerant plant:*** a container or seed propagated plant that has the ability to endure prolonged periods of dry weather after establishment.

***emitter:*** drip irrigation fittings that deliver water slowly from the system to the soil.

***as-builts:*** a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the Contractor.

***established landscape:*** the point at which plants in the landscape have developed roots into the soil adjacent to the root ball.

***establishment period:*** the first year after installing the plant in the landscape.

***estimated total water use:*** the annual total amount of water estimated to be needed to keep the plants in the landscape area healthy. It is based upon such factors as the local evapotranspiration rate, the size of the landscape area, the types of plants and the efficiency of the irrigation system.

***ET adjustment factor:*** a factor of 0.8, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of

water that needs to be applied to the landscape. A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor portion of this calculation. The irrigation efficiency for purpose of the ET Adjustment factor is 0.625. Therefore, the ET adjustment factor  $(0.8) = (0.5/0.625)$ .

**evapotranspiration rate:** the quantity of water evaporated from adjacent soil surfaces and transpired by plants during a specific time.

**flow rate:** the rate at which water flows through pipes and valves (gallons per minute or cubic feet per second).

**groundcover:** low plants, either herbaceous or woody, or mulches, that cover the soil surface.

**hardscape:** patterned paving material or an integral continuation of patterned paving material with enhanced concrete such as exposed aggregate, cobblestone, colored or salt finish.

**hydroseeding:** commonly used to describe the method of applying seeds, mulch, fertilizer and soil stabilizers to slopes or other planting areas.

**infiltration rate:** the rate of water entry into the soil expressed as a depth of water per unit of time (i.e., inches per hour).

**Landscape Architect:** a person registered by the State, who performs professional work in physical land planning and integrated land development, including the design of landscape planting programs and irrigation systems.

**Landscape Contractor:** licensed by the State to install plants, irrigation equipment and other landscape features as specified by the owner or a State licensed landscape architect. Landscape contractors are not licensed by the State to prepare landscape plans.

**landscape plans:** for the purposes of this manual, landscape plans shall mean any plans or drawings required to satisfy landscape requirements within the City of Santa Maria Municipal Code. The plan may consist of one or more of the following types of drawings: planting, irrigation, constructions, lighting, grading and other drawings and landscape items, details or specifications. At minimum, landscape plans shall mean and include a planting, irrigation and water management plan.

**landscaped area:** the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, hardscape and other non-porous areas. Water features are included in the calculation of the landscaped area.

**lateral line:** the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.



**mainline:** the pressurized pipeline that delivers water from the water source to the valve or outlet.

**mulch:** may be any organic or inorganic material such as leaves, bark, straw or other materials left loose and applied to the soil surface for the beneficial purpose of reducing evaporation.

**native plant species:** a plant that is indigenous to the area and/or plant species native to the region, which once established is capable of sustaining growth under local climatic conditions.

**operating pressure:** the pressure at which a system of sprinklers is designed to operate, usually indicated at the base of a sprinkler.

**overhead sprinkler irrigation systems:** those with high flow rates (pop-ups, impulse sprinklers, rotors, etc.)

**overspray:** the water, which is delivered beyond the landscaped area, wetting pavements, walkways, structures or other non-landscaped areas.

**plant factor:** a factor that when multiplied by reference evapotranspiration, estimates the amount of water used by plants. For purposes of this manual, the average plant factor of lower water using plants ranges from 0 to 0.3, for average water using plants the range is 0.4 to 0.6, and for high water using plants the range is 0.7 to 1.0.

**recreational area:** areas of active play or recreation such as sports fields, picnic grounds or other areas with intense foot traffic.

**reference evapotranspiration or ETo:** a standard measurement of environmental parameters, which affect the water use of plants. ETo is given in inches per day, month, or year, and is an estimate of the evapotranspiration of a large field of 4" to 7" tall, cool-season grass that is well-watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated.

**run-off.** water, which is not absorbed by the soil or landscape to which it is applied and flows from the area. For example, run off may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a severe slope.

**shrub:** woody perennial plant with single or multiple basal stems.

**slope:** the inclined exposed surface of a fill, cut or natural terrain.

**soil moisture sensing device:** a device that measures the amount of water in the soil.

**soil texture:** the classification of soil based on the percentage of sand, silt, and. clay in the soil.

**sprinkler head:** a device which sprays water through a nozzle.

**static water pressure:** the pipeline or municipal water supply pressure when water is not flowing.

**station:** an area served by one valve or by a set of valves that operate simultaneously.

**sustainable landscaping:** one that preserves and protects nature's balance while providing aesthetic pleasure and utilitarian function. It includes native and introduced plants well suited to existing light, soil and moisture conditions and low inputs of labor, fertilizer and pesticides to thrive.

**tree:** a perennial woody plant with one or more well-defined stems or trunks which can achieve heights of 15 feet or greater.

**Turf:** a surface layer of earth containing mowed grass with its roots. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue and Tall fescue are cool season grasses. Bermuda grass Kikuyu grass, seashore paspalum, St. Augustine grass, Zoysia grass and Buffalo grass are warm season grasses.

**valve:** a device used to control the flow of water in the irrigation system.

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